

# Renal Department Annual Report and Quality Indicators 2011

Authors:

Kristy Roh, Acting QA CNC

Elizabeth Josland, Nephrology and Renal Supportive Care CNC

Yanella Martinez-Smith Vascular Access CNC

Tania Burns Transplant CNC

Coralie Meek, Renal Anaemia Coordinator

Jennifer Beddoe, Ambulatory Blood Pressure Monitoring, Clinical Nurse Specialist

Dr Partha Shanmugasundaram, Renal Consultant

Tracey Blow, Renal Dialysis Nursing Unit Manager

Associate Professor Dr Ivor Katz

Professor Mark Brown,

Director, Department of Renal Medicine, St George & Sutherland Renal Service

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## Introduction

The primary purpose of this report is to describe our department's activities and our quality programs against benchmarking that allows us to detect problems and institute systems or treatments that improve our patients' outcomes. This is facilitated by regular presentations and discussions of these data at department meetings.

A broad aim remains to compare our Unit's performance against benchmarks where they exist or to ensure we are meeting what we consider best practice in the following areas:

1. Maintaining an adequate workforce to provide high quality patient care, education and research.
2. The management of haemodialysis patients' outcomes in terms of: survival, biochemical and haematology parameters and dialysis adequacy.
3. NSW chronic kidney disease benchmarks particularly relating to distribution of dialysis modalities.
4. Water quality to AAMI standards.
5. Vascular access outcomes with a focus on primary access; central venous catheter infection and complication rates.
6. Peritonitis and peritoneal dialysis exit site infection rates
7. Appropriate patients accepted onto dialysis
8. Pre-dialysis clinic activities for those with advanced renal failure planning dialysis or transplantation.
9. Palliative care of symptomatic renal dialysis patients and supportive care of those patients who have chosen a maximum conservative care pathway.
10. Renal transplant patient and graft outcomes at benchmark levels
11. Renal biopsy outcomes
12. Research – this is reported separately

(See <http://stgrenal.med.unsw.edu.au/StGRenalWeb.nsf/page/Research>)

This report is outstanding in its depth and breadth of analyses of outcomes in the above areas and is the culmination of a great deal of work by many, but especially the authors listed above. It is clear that in most areas we are providing a service of quality outcomes above those nationally or internationally. These data have also provided us with some areas where we can still improve and we have taken action to address those areas.

I would like to thank every member of our department; medical, nursing, allied health, and administrative; all of whom make such dedicated contributions to ensuring that our patients receive the best possible treatment and care.

Mark Brown  
Director, St. George and Sutherland Renal Service.

## Executive Summary

1. **Workload** continues to increase. In the 2010-11 year:
  - a. We attended to 5807 medical clinic visits across a range of dialysis, transplant, hypertension, obstetric medicine, general nephrology and renal supportive care clinics. This does not account for the vast amount of work done in private practice, without which the service would be swamped.
  - b. We cared for an average of 25 ongoing inpatients and 24 ongoing consults per week in hospital.
  - c. We provided 18830 in-centre hemodialysis sessions and 4773 satellite dialysis sessions.
  - d. Our senior nurses provided 304 outpatient clinic assessments for pre-dialysis or vascular access planning and education
  - e. Our peritoneal dialysis nurses managed an average of 54 ongoing patients per month
  - f. At the most recent ANZDATA report (which reflects data at end of 2010) we were dialyzing 248 patients (69 % of all SESLHD dialysis) and cared for 137 transplant patients (44% of all SESLHD transplant patients).
  - g. We have 5.2FTE nephrologists covering at the end of 2011 404 ESKD patients (combined dialysis and transplants) for an equivalent of 1 nephrologist per 78 ESKD patients. This is a workload 30% above the most recent Australia wide assessment of 1 nephrologist per 60 ESKD patients.
  - h. We have increased our CNC cohort and now have CNCs to provide specialized care in Transplantation (1.0FTE), CKD (1.0FTE), Quality assurance (0.5FTE), vascular access (1.0FTE), Renal Supportive Care (0.5FTE) and CKD (1.0FTE).
  - i. We are working on appropriate benchmarking for allied health staffing.

## 2. Haemodialysis

- Patient survival at 1(89%), 3(68%) and 5 years (53%) were above national average survival figures (ANZDATA) despite high co-morbid illnesses.
- Significant improvements occurred in biochemistry results over 2011 in serum HDL, Triglyceride, and ferritin levels, serum calcium, corrected calcium, albumin, serum phosphate and calcium phosphate product.
  - CaxPO4 product, serum ferritin, and URR are all better than national average figures.
- Haemodialysis adequacy outcome was very satisfying with achievement of an adequate Kt/V  $\geq 1.2$  in 96% of patients and a URR  $\geq 65\%$  in 91%.
- Diabetes control (HbA1c $<7$ ) was achieved in half of our HD diabetics and remains an area for improvement.

## 3. NSW Ministry of Health benchmarks were generally met:

- a. 44% of dialysis patients were using a home based dialysis therapy (peritoneal dialysis and home haemodialysis) which is an excellent achievement (39% for NSW overall) though not quite at the benchmark of 50%.
  - b. 20% used home haemodialysis (at benchmark) compared with national figures of ANZDATA 9% and NSW=13%.
  - c. 24% of patients were on peritoneal dialysis (vs. 26% nationally and a NSW benchmark of 30%). This is an area of opportunity for future dialysis at St George.
  - d. 12% used satellite haemodialysis at TSH Unit (vs.37% nationally and a NSW benchmark of 30%). We have mechanisms in place to ensure patients residing in the Sutherland Shire are offered this modality but this deficiency will not be resolved without a new satellite dialysis Unit in the St George district.
4. The unit continued to maintain its high standard for monitoring and managing its **water quality for haemodialysis**.
- a. Water quality testing resulted in the removal of one portable RO (WRO) when a high CFU reading was detected. The WRO was disinfected then returned to service when results were within the accepted limits.
  - b. There were no endotoxins detected in 2011 and all elements for water quality for all remaining haemodialysis equipment were maintained within AAMI limits.
5. 46% of patients commenced haemodialysis with **a functioning permanent hemodialysis access** in 2011 improving from 26% in 2010 but still below the national ANZDATA average (51%).

- a. This outcome has improved since 2007 (2007 – 31%; 2008 – 29%; 2009 – 36%), associated with the advent of a Vascular Access Nurse position in the unit, improved protocols and making this issue a major focus of activity for our department as it has become a National benchmark for dialysis Units.
  - b. Review processes are in place to ensure that every case of patient commencing hemodialysis without permanent vascular access is discussed at department level; this ensures all avoidable cases are addressed.
  - c. 92% of incident HD patients had a functioning AVF/AVG in 2011 compared with 86% nationally.
  - d. AVF and AVG patency rates are above international benchmarks.
  - e. The number of central vein access catheters continues to fall and reached its lowest rate in 2011.
  - f. **Blood stream infection (BSI) rates** from catheter use remain very low (0.18/1000 catheter days; 1%). These have decreased year by year, from rates as high as 1.05/1000 catheter days (13%) in 2006.
    - i. These results are well within international benchmarks (KDOQI <1.5/1000 and evidence based literature averages range from 0.1-5.5/1000).
    - ii. The use of antibiotic locks post dialysis has been a major contributor to this reduction together with more native fistulas, reduced synthetic fistulas, tunnelled and non tunnelled central venous catheters (CVC).
  - g. BSI rates have also reduced amongst patients with **arterial-venous fistulae (AVF)** from 3% in 2009 to 1.3% in 2010.
    - i. This was perceived to be due to fewer patients using the buttonhole needling technique and because of the policy of early removal of CVCs.
  - h. Blood stream infections this year decreased amongst patients with an **arterial-venous graft (AVG)**.
    - i. Providing heightened and regular surveillance on our permanent access has also reduced the number of thrombotic events in 2010.
6. The **peritonitis rate** surpasses the ANZDATA benchmark in months per patient episode. At St George Hospital it is now 1/48 months compared to 1/19 months for national comparison (ANZDATA 2010).
- a. Of the patients on dialysis >3 years, 69% were peritonitis free, compared to 29% from ANZDATA.
  - b. Exit site infection rate improved, now 1/42 months in 2011 from 1/37 months in 2010.
  - c. There have been improvements in PD dialysis adequacy which include improved haemoglobin levels and iron saturation together with higher serum albumin levels.

d. Renal bone mineral metabolism control appeared worse in 2011 with slightly higher serum phosphate and higher than expected calcium x phosphate products and serum calcium.

## 7. Patient demographics and acceptance on to dialysis

- St George has a higher rate of older patients in the 75-84 year old group commencing peritoneal dialysis (30%) and haemodialysis (26%) as their first mode of dialysis in the period 2009-2011 than comparative national ANZDATA figures of 17% PD and 12% HD respectively.
  - New patients over 2009 – 2011 had an average BMI of 27 in PD and 30.5 in HD.
  - Patients starting dialysis had less overall co morbidities than ANZDATA with the exception of diabetes.
  - The average age of patients commencing dialysis at St George over 2009 - 2011 was 65yrs for haemodialysis and 63 for PD patients. ANZDATA 2010 reports the average age for all new patients as 61years
  - There was pleasingly a reduced number of late referrals (dialysis within 3 months of referral to a nephrologist) in 2011 (12% for HD, 19% for PD) compared with other years (2010 - 40%; 2009 – 30%). This is mainly attributed to less cases of acute renal failure. Late referrals were below those of ANZDATA (21%).
  - 35 % of HD patients and 22% of PD patients commenced dialysis with eGFR above 10ml/min, an area for monitoring and the department has commenced a monthly discussion of all pre-dialysis patients with eGFR  $\leq 15$ .
8. The **Pre-dialysis clinic** has been operating since April 2002. In 2011 there was a 55% increase in activity with 120 new attendees and 72 follow up appointments compared to 67 new attendees and 67 follow up appointments in 2010.
- a. 68% had patient education at least 3 months prior to their dialysis, excluding late referrals. This is an area for potential improvement.
  - b. The clinic provides excellent patient education and monitoring of progress but referrals still need to be made earlier.
9. There have been 731 visits to the **renal supportive care clinic** since it commenced in March 2009; 403 of these visits were in 2011.
- a. The average age of patients is 77 years with 63% of attendees being male.
  - b. At the end of Dec 2011 there were 91 patients on a non-dialysis pathway.
  - c. The first Renal Memorial Service was held in 2011 to support family and friends of dialysis patients who had passed away during the past year.
  - d. Patients and families indicated significant satisfaction with this service; patient QOL is maintained in those on a non-dialysis pathway and symptom control is improved from initial visits



- e. Ongoing studies are addressing patient survival in elderly patients on non-dialysis pathways.
10. This is the 1<sup>st</sup> report containing outcomes for our **renal transplant** recipients. At Dec 2011 we cared for 155 patients.
- a. St. George dialysis patients comprise 50% of patients on the ECRTS transplant waiting list. 81% of St George dialysis patients aged 25-54 are on the transplant waiting list and the other 19% have medical or psychosocial reasons for not being on the list.
  - b. Half of transplant donors are deemed medically unsuitable and only 30% remain as willing donors or progress to actual donation.
  - c. Renal transplant 1 and 5 year patient survival (97% and 90%) and graft survival (92 % and 82%) are similar to national averages. We need to remain vigilant about graft survival rates.
  - d. ALOS in hospital is 14 days for patients in their 1<sup>st</sup> year of transplantation.
  - e. BPAR rates were only 12%, well below the benchmark of 30%
  - f. Documented CMV infection or disease rates are 17%
  - g. Documented BK infection rate is 7% with 2% BK VAN, below international figures
  - h. 10% had other significant infections
  - i. NODAT rates are 20%, slightly below international figures
  - j. 65% of the transplant cohort have hypertension, 20% cancer and 10% clinical IHD; 74% have a serum creatinine <150 and 33% <100. 81% have a PCr <30.
11. There were 107 **renal biopsies** performed in 2011. Complication rates have risen slightly, at 10% (macroscopic hematuria or perinephric hematoma). 1 patient required transfusion and no embolisation was needed. These rates are still slightly above international figures, though ascertainment bias remains a possibility in published data.
12. The **research** report shows a very active research department with an average of 20 or more papers published per year over the past decade and many invited talks at national and international meetings.

## NSW Health Benchmarks

The NSW Department of Health has developed benchmarks for the distribution of dialysis modalities that is part of the NSW Renal Dialysis Service Plan to 2011 document (NSW Health 2007). This document contains indicators for managing people with Chronic Renal Disease.

**Table 1: Comparison of St George dialysis modality rates with NSW Health benchmarks and the Australian data from ANZDATA**

	Hospital dialysis (%)	Satellite (%)	Home HD (%)	Peritoneal Dialysis (%)
<b>NSW Health Benchmark</b>	<b>20</b>	<b>30</b>	<b>20</b>	<b>30</b>
<b>ANZDATA NSW 2011</b>	<b>24</b>	<b>37</b>	<b>13</b>	<b>26</b>
<b>St George 2006</b>	<b>61</b>	<b>0</b>	<b>20</b>	<b>18</b>
<b>St George 2007</b>	<b>59</b>	<b>0</b>	<b>20</b>	<b>21</b>
<b>St George 2008 % (n)</b>	<b>44 (109/249)</b>	<b>14 (34/249)</b>	<b>19 (48/249)</b>	<b>23 (58/249)</b>
<b>St George 2009 % (n)</b>	<b>43 (108/253)</b>	<b>13 (33/253)</b>	<b>22 (55/253)</b>	<b>23 (57/253)</b>
<b>St George 2010 % (n)</b>	<b>45 (111/247)</b>	<b>14 (34/247)</b>	<b>21 (51/247)</b>	<b>21 (51/247)</b>
<b>St George 2011 % (n)</b>	<b>44 (110/251)</b>	<b>12 (31/251)</b>	<b>20 (50/251)</b>	<b>24 (60/251)</b>

**Table 2: Indicators from NSW Health 2007, pp iii - iv. St George measurements indicate how these indicators are being measured and the results for 2011**

Principles	Indicators	St George Measurements
Integrated secondary prevention programs for CKD	1. Proportion of eligible patients with GFR <30ml/min when first seen by Nephrologist	1. Not measured
Patients with a diagnosis of CKD receive timely, appropriate investigation, information, treatment and follow-up.	2. Proportion of patients commencing dialysis whose first referral to a nephrologist is <90 days prior to first dialysis	2. Haemodialysis late referral rate 12% in 2011. Peritoneal Dialysis overall late referral rate 19% in 2011. ANZDATA late referral 21%.
Patients with progressive CKD receive appropriate education and preparation for ESKD and treatment in partnership with health care professionals.	3. Proportion of patients who completed a pre-dialysis education program.	3. 68% new dialysis patients (excluding acute dialysis and late referrals) had pre-dialysis education ≥ 3 months before dialysis commencement.
Patients with CKD requiring treatment, have timely access to appropriate vascular access services.	4. Proportion of eligible patients commencing haemodialysis with permanent vascular access.	4. 46% of patients' commenced haemodialysis with a functioning AVF; SVG or AVG. ANZDATA 2010 result was 34% (NSW) and 44% (Australia).
Patients with CKD requiring treatment, have access to clinically appropriate forms of treatment either in home, community or hospital	5. Proportion of patients dialysed at home.	5. Total STG dialysis population: Home=44% (20% home haemodialysis & 24% PD) ANZDATA NSW = 39% <i>*20% of all STG haemodialysis patients dialyse at home (ANZDATA AUS=9%, NSW=13%)</i>

Principles	Indicators	St George Measurements																																								
facilities, designed around individual patient needs, including transplantation services where clinically appropriate.	6. Travel time - Proportion of patients for whom travel time to their dialysis location is $\leq 1$ hour.	6. 100%																																								
Patients with CKD receive high quality, evidence-based, treatment services.	<p>7. Patient waiting times – Frequency a patient commences dialysis more than 30 minutes after scheduled time.</p> <p>8. Proportion of eligible patients who receive adequate haemodialysis (i.e. <math>URR \geq 65\%</math>)</p> <p>9. Proportion of eligible haemodialysis patients with total weekly dialysis hours <math>&gt; 15</math> hours.</p> <p>10. Proportion of eligible peritoneal dialysis patients with <math>CCL &gt; 50L</math> per week (or <math>Kt/V \geq 1.8</math>).</p> <p>11. Vascular access infection events per 100 patient catheter days.</p> <p>12. Number of peritoneal infections per peritoneal dialysis patient-month.</p> <p>13. Renal Transplant survival at 1, 3, 5 years</p>	<p>7. Not measured.</p> <p>8. 91% <math>URR \geq 65\%</math> ANZDATA 2008: 92% <math>URR \geq 65\%</math></p> <p>9. St George: 27% <math>\geq 15</math> hours per week in 2011 ANZDATA 2009: 35% dialyse <math>\geq 15</math> hours per week</p> <p>10. 59% had a <math>CCL &gt; 50L</math> (81% had a <math>Kt/V \geq 1.8</math>). ANZDATA has not published <math>CCL</math> or <math>Kt/V</math> results in 2010.</p> <p>11. CVC infection rate 0.18/1000 catheter days compared to NKF-KDOQI 2006 benchmark <math>&lt; 1.5/1000</math> catheter days</p> <p>12. Peritonitis incidence per patient months was one episode per 47.9 months compared to 19.1 for the whole of Australia (ANZDATA).</p> <p>13. Graft survival from transplant until death, return to dialysis or most recent date of follow up 2000-2009</p> <table border="1"> <thead> <tr> <th>Graft</th> <th>Survival</th> <th>1yr</th> <th>3yr</th> <th>5yr</th> </tr> </thead> <tbody> <tr> <td>STG</td> <td></td> <td>91.9</td> <td>85.3</td> <td>81.7</td> </tr> <tr> <td>Aust</td> <td></td> <td>93.4</td> <td>88.4</td> <td>83.2</td> </tr> </tbody> </table>	Graft	Survival	1yr	3yr	5yr	STG		91.9	85.3	81.7	Aust		93.4	88.4	83.2																									
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Patients with CKD at risk of suffering acute renal failure, have access to high quality hospital services in partnership with renal services.	<p>14. Patient survival in dialysis treatment at 1, 3, 5 years.</p> <p>15. Patient survival after Renal Transplant at 1, 3, 5 years.</p>	<p>14: Survival 2000 - 2009</p> <table border="1"> <thead> <tr> <th>Patient</th> <th>Survival</th> <th>1yr</th> <th>3yr</th> <th>5yr</th> </tr> </thead> <tbody> <tr> <td>STG Hdx</td> <td></td> <td>89.2</td> <td>68.3</td> <td>53.0</td> </tr> <tr> <td>Aust Hdx</td> <td></td> <td>86.8</td> <td>65.3</td> <td>46.4</td> </tr> <tr> <td>STG PD</td> <td></td> <td>90.0</td> <td>59.7</td> <td>46.5</td> </tr> <tr> <td>Aust PD</td> <td></td> <td>88.7</td> <td>63.3</td> <td>43.2</td> </tr> </tbody> </table> <p>15. Patient Survival from transplant until death or most recent follow up 2000 - 2009</p> <table border="1"> <thead> <tr> <th>Patient</th> <th>Survival</th> <th>1yr</th> <th>3yr</th> <th>5yr</th> </tr> </thead> <tbody> <tr> <td>STG</td> <td></td> <td>97.0</td> <td>94.2</td> <td>90.0</td> </tr> <tr> <td>Aust</td> <td></td> <td>97.2</td> <td>94.3</td> <td>91.5</td> </tr> </tbody> </table>	Patient	Survival	1yr	3yr	5yr	STG Hdx		89.2	68.3	53.0	Aust Hdx		86.8	65.3	46.4	STG PD		90.0	59.7	46.5	Aust PD		88.7	63.3	43.2	Patient	Survival	1yr	3yr	5yr	STG		97.0	94.2	90.0	Aust		97.2	94.3	91.5
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## Haemodialysis

Written by: Kristy Roh and Tracey Blow

St George Hospital (STG) has a 34 chair in-centre service providing high level haemodialysis (HD) to 110 patients per month. In 2010-2011 financial year there were 18,330 separations for HD.

The renal department is responsible for running the satellite HD centre at Sutherland Hospital (TSH). This site has 12 renal satellite chairs but only 9 are currently opened and are providing access to HD for patients requiring less clinical support. In the 2010-2011 financial year there were 4827 same day separations at the TSH facility.

Home Haemodialysis training is provided at the STG campus. There are currently 50 (20%) patients on home haemodialysis, which is at the NSW benchmark target.

The Satellite service does not reach NSW benchmark targets with only 12% of dialysis patients compared with the desired 30% benchmark. However, there is no satellite service for the St George area. Importantly almost half of the 'in-centre' patients are being dialysed in a 'low care' section of our haemodialysis unit. These patients could potentially be transferred to a satellite facility if one was available closer to STG. This would raise our satellite numbers closer to the NSW benchmark target. In-centre HD continues to be more than double the desired target due to the lack of another satellite unit.

**Table 3: The 2011 distributions of dialysis modalities**

Dialysis modalities	n	%
PD	60	24 <sup>#</sup>
Home Dialysis	50	20 <sup>#</sup>
Satellite	31	12
In-centre	110	44
<b>Total</b>	<b>251</b>	

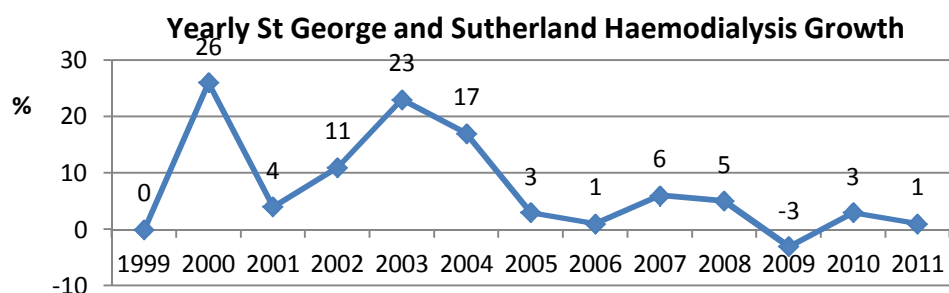
<sup>#</sup> Home Therapies

There were a total of 191 HD patients at the end of 2011, with 26% being on home HD, 16% being at satellite HD, and 58% (110) on in-centre HD.

### Activity

The total haemodialysis activity level for St George and TSH patients (in-centre and satellite) increased by only 1% from 22926 sessions in 2010 to 23157 sessions in 2011. The graph below shows the annual percentage growth in in-centre and satellite dialysis episodes over the past 10 years.

**The reduced growth is partly explained by the growth in patients dialysing at home.**



## Patient Flow

**Table 4: in centre patient flow**

In-centre haemodialysis patients at beginning of year		2007	2008	2009	2010	2011
		<b>141</b>	<b>144</b>	<b>109</b>	<b>108</b>	<b>111</b>
In 1)	New Patients	28	33	32	35	26
2)	Transfers from other units	2	3	7	1	1
3)	Temporary transfer from PD	4	6	1	8	1
4)	Permanent transfers from PD	10	14	7	13	10
5)	Failed transplants	1	3	0	2	1
6)	Transfer from Home Hdx	4	2	1	1	0
7)	Transfer from Satellite		5	6	4	3
<b>Subtotal</b>		<b>49</b>	<b>66</b>	<b>54</b>	<b>64</b>	<b>42</b>
Out8)	Transplants	4	5	2	4	5
9)	Transfers to other units	2	2	6	2	2
10)	Transfers to Home Hdx	6	7	7	7	5
11)	Transfers overseas	0	0	1	1	0
12)	Transfers to PD	12	14	6	12	2
13)	Transfers to Satellite		39	6	7	8
14)	Regain Function		1	2	3	0
15)	Deaths (medical)	11	17	15	11	17
16)	Deaths (withdrawal)	11	16	10	14	4
<b>Subtotal</b>		<b>46</b>	<b>101</b>	<b>55</b>	<b>61</b>	<b>43</b>
<b>Net Gain</b>		<b>3</b>	<b>-35</b>	<b>-1</b>	<b>3</b>	<b>-1</b>
<b>In-centre haemodialysis patients at end of year</b>		<b>144</b>	<b>109</b>	<b>108</b>	<b>111</b>	<b>110</b>

**Table 5: satellite patient flow**

Satellite haemodialysis patients at beginning of year		2008	2009	2010	2011
		<b>0</b>	<b>34</b>	<b>33</b>	<b>34</b>
In a)	New Patients	0	1	1	1
b)	Transfers from other units	2	1	3	0
c)	Transfer from PD	1	0	1	0
d)	Transfer from Incentre	39	6	7	8
<b>Subtotal</b>		<b>42</b>	<b>8</b>	<b>12</b>	<b>9</b>
Out e)	Transplants	1	0	2	1
f)	Transfers to Home Hdx	2	1	1	1
g)	Transfers to PD		1	1	2
h)	Transfers to Incentre	5	6	3	3
i)	Transfer to other units		1	0	0
J)	Deaths (medical)	0	0	2	4
K)	Deaths (withdrawal)	0	0	1	1
l)	Regain Function			1	0
<b>Subtotal</b>		<b>8</b>	<b>9</b>	<b>11</b>	<b>12</b>
<b>Net Gain</b>		<b>34</b>	<b>-1</b>	<b>1</b>	<b>-3</b>
<b>Satellite haemodialysis patients at end of year</b>		<b>34</b>	<b>33</b>	<b>34</b>	<b>31</b>

**Table 6: Home haemodialysis patient flow**

Home haemodialysis patients at beginning of year		2007	2008	2009	2010	2011
		<b>51</b>	<b>49</b>	<b>50</b>	<b>54</b>	<b>51</b>
In	New Patients	5	1	3	1	3
	Transfer from PD	0	0	0	0	0
	Transfers from other units	0	3	0	0	0
	Transfer from Satellite		1	1		1
	Failed transplants	0	0	0	1	0
	New Transfer from Incentre Hdx	6	5	4	6	5
	In training at the end of the year		2	1		1
<b>Subtotal</b>		<b>11</b>	<b>12</b>	<b>8</b>	<b>8</b>	<b>10</b>
Out	Transplants	6	6	8	1	6
	Transfers to other units	1	0	2	1	0
	Transfers to Incentre Hdx	2	1	1	4	0
	Transfers to Satellite	0	0	0	0	1
	Deaths	1	1	0	4	4
<b>Subtotal</b>		<b>10</b>	<b>8</b>	<b>11</b>	<b>10</b>	<b>11</b>
<b>Net Gain/Loss</b>		<b>-2</b>	<b>1</b>	<b>4</b>	<b>-3</b>	<b>-1</b>
<b>Home haemodialysis patients at end of year</b>		<b>49</b>	<b>50</b>	<b>54</b>	<b>51</b>	<b>50</b>

## **Summary:**

- On 31<sup>st</sup> December 2011, 31 (12%) STG patients were dialysing at the satellite unit. The ANZDATA 2011 survey indicated that 37% of NSW haemodialysis patients dialyse within a satellite facility. The St George Hospital does not have a satellite dialysis facility. Full capacity for our satellite unit at Sutherland Hospital is 48 patients, currently there are 34 patients.
- Home haemodialysis training was completed for 8 patients; there was 1 patient in training at the end of the year. Four in-centre patients, 1 satellite patient and 3 new patients were trained successfully in 2011.
- Twenty percent of St George haemodialysis patients are dialysing at home compared to 13% in NSW as stated in the ANZDATA 2010.

## **Future Plans**

- Further development of home haemodialysis training to increase the number of staff with the ability to train patients.
- Extension of home haemodialysis training in TSH satellite dialysis unit to promote and complete home training.
- Establishment of a new satellite dialysis unit for the stable low level care haemodialysis patients currently receiving in-hospital dialysis at SGH in order to achieve NSW targets of maximum 20% hospital HD.

## Haemodialysis Water Quality

### Background and Activity Levels

- The water quality was audited on 4 West in-centre and satellite dialysis unit 2<sup>nd</sup> monthly for micro-organisms, Aluminium, chloramines and total chlorine.
- The U.S. Association for the Advancement of Medical Instrumentation (AAMI) guidelines (Association for the Advancement of Medical Instrumentation (AAMI) 2006) and European Best Practice Guidelines (EBPG) were used to provide a standard to monitor water quality.
- Full element analysis (Heavy elements) was conducted biannually and endotoxins are collected yearly.
- Gambro performs the task of collecting water specimens and following up abnormal results along with equipment maintenance. Any abnormalities and issues are reported.
- The audits are required to prevent infection amongst haemodialysis patients and maintain patient safety.
- Daily chloramine testing of central RO water is performed by nursing staff at each site using a chlorine test kit.
- Monthly filter change for HDF machines by the nursing staff
- 6 monthly infusate testing for HDF water purity by the nursing staff.

### Summary

- The guidelines indicate action is required when results are >50CFU/mL. Microbiology water samples taken throughout the year resulted in the removal of one portable RO (WRO due to abnormal results of 150 CFU/mL) in May and June which was retested and returned to service when results returned to normal.
- Element testing including Aluminium testing occurs twice per year; elevated chloramine results found in June in two WRO hence these were retested. Retested results were within the guideline recommendations. Sutherland audit results were all within normal limits.

### Future plans

- Hi flux dialysis commenced in 2009 due to good water quality on a selected group of patients after consultation with nephrologists and this continued in 2011.
- HDF water testing will be due in February 2012 to monitor water safety and this will be ongoing process for 6 monthly bases.
- Gambro has performed the water testing throughout 2011 for both St George and Sutherland units. Gambro communicates water testing results via email to the Nurse Unit Managers (NUMs) and any abnormalities detected will be rectified accordingly.



## Biochemical and haematological targets and dialysis adequacy

### Background and Activity Level

- Routine monthly bloods are attended on haemodialysis patients as per our existing monthly protocol.
- Blood results were audited in April and October 2011 from 136 and 135 (99%) chronic in-centre and satellite haemodialysis patients respectively.

### Outcomes being measured

- Our aim is to compare our unit's performance against the National recommended guidelines (CARI) (CARI 2006) for the following parameters: Calcium, Phosphate, Corrected Calcium, Calcium x Phosphate product, Albumin, Magnesium, Haemoglobin, Iron studies, and dialysis adequacy (Kt/V and URR).
- Audit results are also compared to previous audit results and the ANZDATA 2010 report.
- Lipid target range is set by the National Heart Foundation (National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand 2005) for high risk patients.

### How did we Record, Store and Analyse the Data?

- Blood results were entered into an Excel Database.
- Analysis of data and basic statistics was performed using the PASW 18 statistical program.

**Table 7: Percent of haemodialysis patients falling within the target range**

Parameter	Target	Apr 10	Oct 10	Apr 11	Oct 11	ANZDATA 10
Ca ***	2.25-2.58 mmol/L	46	71	65	59	61
Corr Ca***	2.1-2.4 mol/L	54	36	31	40	-
PO4***	0.8-1.6 mmol/L	59	67	55	62	
CaPO <sub>4</sub> ***	<4.0 mmol/L	63	78	62	70	66
Ferritin***	200-800 ug/L	80	76	72	74	61
Fe Sats	20-50%	69	79	76	72	
Mg***	0.74-1.03 mmol/L	70	76	83	76	
Albumin*	33-48 g/L	63	66	72	66	-
PCR	<1.0	47	52	60	65	-
KT/V	≥ 1.2	93	92	95	96	-
URR	>65%	91	92	94	95	91
PTH	10-35 nmol/L	43	36	43	50	
Normal iron studies	Ferritin 100-800&TSAT 20-50%	64	89	55	57	

## Haemoglobin

- KDOQI (2007) (NKF-KDOQI 2007) recommendation for target Hb should *generally* be in the range 110-120g/L due to fluctuations and variability in Hb levels.
- CARI guidelines recommend that haemoglobin not rise more than 10g/L per month. Haemoglobin of 110g/L is a suitable target; concentrations above 130 g/L are to be avoided. There is no data to suggest that those patients who maintain higher haemoglobin without ESA should have their haemoglobin reduced. Newer targets suggested for chronic ESKD are between 100-120g/L. This is the target which is currently being used in the unit.
- The average haemoglobin for all patients during the latest audit was 113 min 83, max 160.
- KDOQI recommend Hb targets in dialysis patients receiving ESA should not exceed >130g/L (KDOQI 2007).
- Overall, 37% of patients had the desired haemoglobin; this has been an improvement from 30 % in 2010 .All haemoglobin ranges were similar to ANZDATA in October 2010.
- In Oct 2011 66 (49%) HD patients had Coronary Artery Disease.
- Analysing Hb for all HD patient in 2011, less than 5% pt had Hb 130-140.
- In Oct 2011, 54% HD patients had 100-120 haemoglobin range.

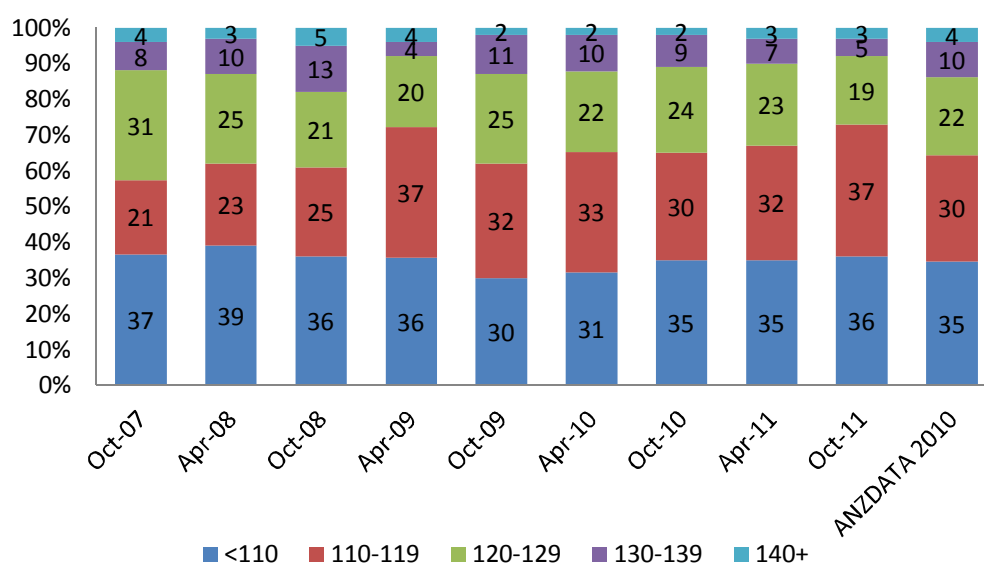


Figure 1: Haemoglobin for all haemodialysis patients

## Lipids for haemodialysis patients

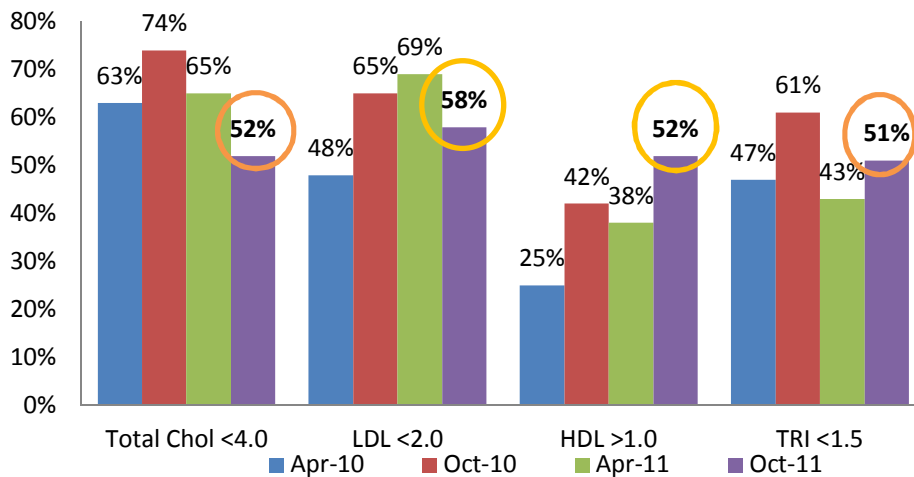


Figure 2: Lipids: high risk patients only (any ANZDATA co-morbidity excluding chronic lung)

- Ranges are recommended by the 2005 national heart foundation (National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand 2005).
- Only (52%) HD patients had total cholesterol <4 in Oct 2011 compared to (74%) in Oct 2010.
- HDL results improved significantly in 2011. Fifty two percent of HD patients had HDL>1 compared to (25%) in April 2010.
- Data is collected only on high risk patients, those with, or suspected of having, CAD, PVD, CVD or Diabetes. Seventy five percent of in-centre and satellite haemodialysis patients were considered high risk during October 2011 audit.

## Total Iron studies

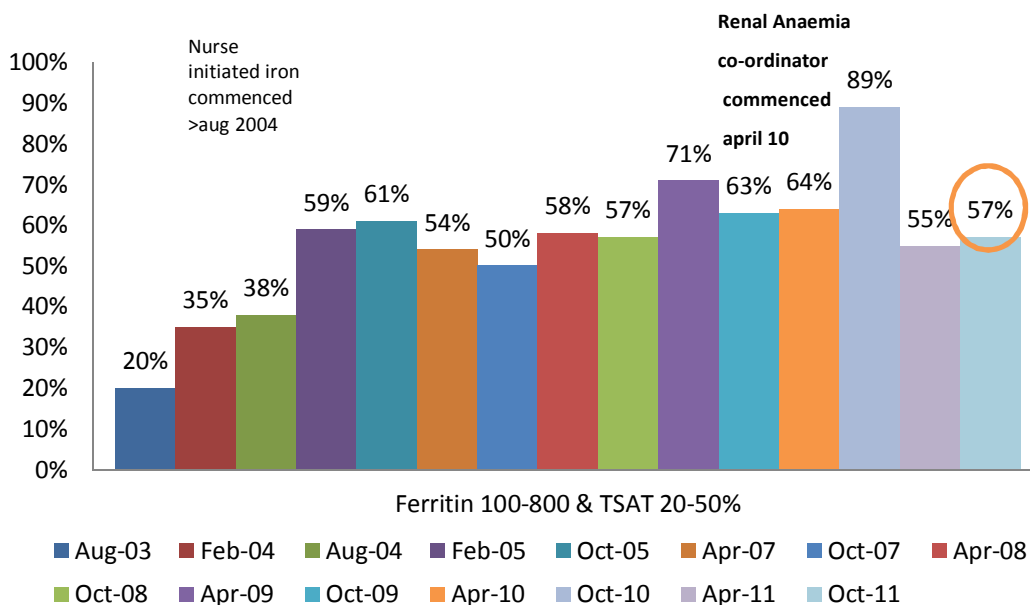


Figure 3: Percent of haemodialysis patients with normal iron studies

## Ferritin

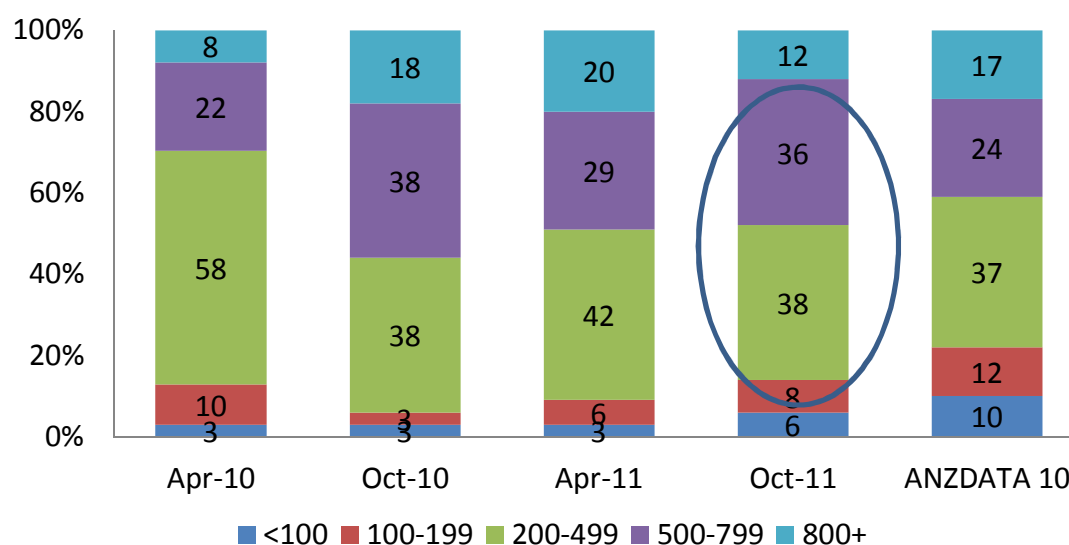


Figure 4: Ferritin compared to ANZDATA

## Ferritin and Transferrin Saturation

- Fifty seven (57%) percent of all patients in October 2011 were iron replete compared to 89% in Oct 10. Iron replete refers to ferritin levels between 100-800ng/mL as well as iron saturation between 20-50%.
- Twelve percent (12%) of patients in October 2011 had a ferritin level >800ng/L which has decreased from previous audits, but is similar to the ANZDATA 2010 (17%) report.
- Eighty two (82%) percent of patients have Ferritin level within the normal range of 100-800 compared to ANZDATA 2010 (73%).
- Transferrin Saturation results in Oct 2011 show less patients have a low level (<23%) compared to ANZDATA 2010 (30%).
- The iron audit was conducted in September, October, November and December in 2011 which reviewed compliance with the nurse initiated protocol. Out of 106 St George HD patients audited 96 % (101) were chosen correct iron regime. At Sutherland satellite dialysis unit (SDU), 100% (29/29) were chosen the correct iron regime. There was 100% compliance with ESA dose was given or withheld and signed for correctly as per protocol for both St George (STG) and SDU.
- From the audit in St George HD patients, only 5% iron doses were missed. Rechecking of Hb 2/52 post ceasing ESA showed improvement of 79% (15/19). Rechecking of Hb 2 weeks post increasing or decreasing ESA 7/8 (88%) compliance noted.
- Overall the iron audit has shown that ongoing education of staff members in regard to anaemia management has led to an excellent compliance results in iron management and results within the targeted ranges for haemoglobin.

## Transferrin saturation

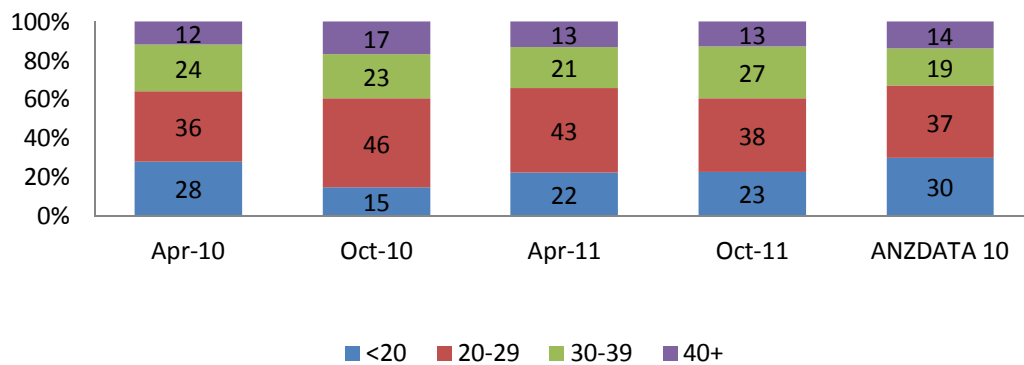


Figure 5: Transferrin Saturation compared to ANZDATA

## Corrected Calcium and Albumin

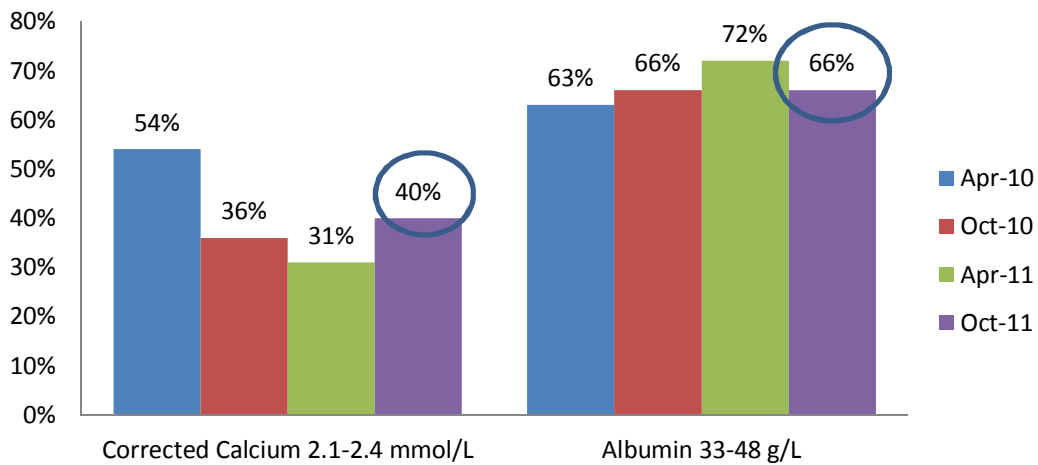


Figure 6: Percent of haemodialysis patients with normal corrected calcium and serum albumin

- Forty percent (40%) of patients achieved normal corrected Calcium compared to (36%) in 2010.
- Increased percentage of patients with normal albumin in April 2011(72%) than 2010 (63%). Statistically significance was found in 2011. Kruskal-Wallis Test performed on Albumin indicated 2011(  $p < 0.05$ ).

## PTH

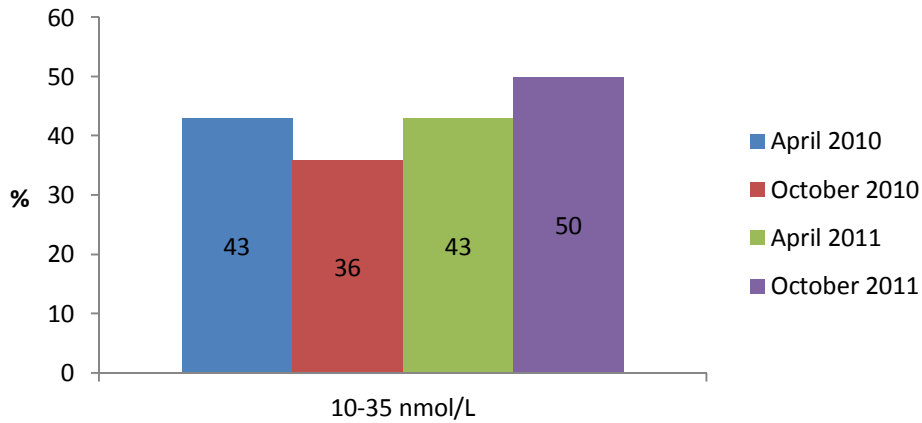


Figure 7: Percent of haemodialysis patients with PTH level 10-35 nmol/L

In October 2011 50% (65/129) with PTH ranges between 10-35 nmol/L compared to 36% (49/135) in October 2010

## Serum Calcium, Phosphate & CaPO<sup>4</sup> product

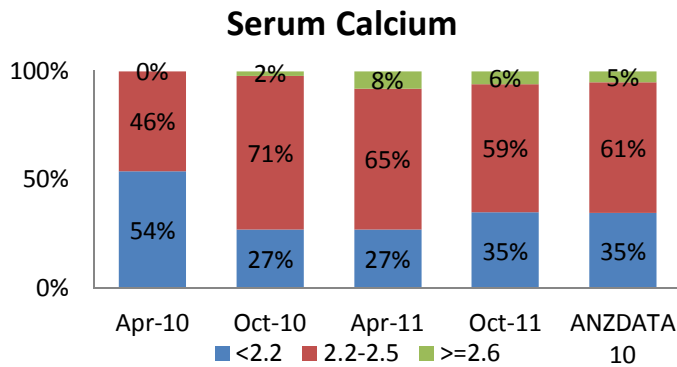


Figure 8: Serum Calcium compared to ANZDATA

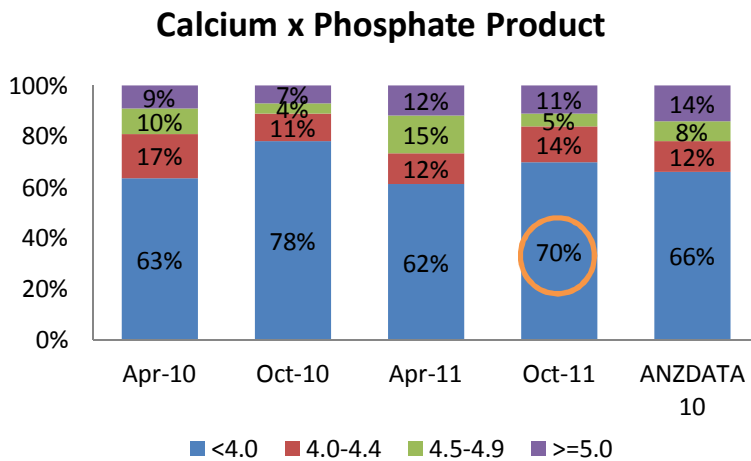


Figure 9: Ca\*PO<sup>4</sup> Product compared to ANZDATA

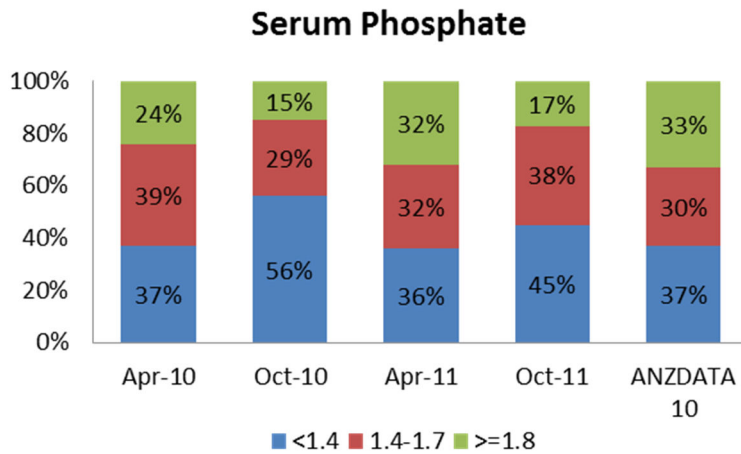


Figure 10: Serum phosphate compared to ANZDATA

There are more patients (70%) with calcium phosphate product of <4 in October 2011 than ANZDATA (2010) which is 66%. Only (11%) had calcium phosphate product level of  $\geq 5$  for our (HD) patients compared to ANZDATA (14%). Calcium phosphate product has significantly improved in October 2011 (Kruskal Wallis:  $p < 0.001$ ). Calcium-phosphate product <4 mmol/L is recommended by the CARI guideline

- There was a significant improvement in serum calcium in October 2011 compared with previous year,  $p < 0.001$ ). Fifty nine percent patients were within the normal limits (2.25-2.58 mmol/L) compared to (46%) in April 2010.
- Less than (17%) patients with serum phosphate level  $\geq 1.8$  compared to ANZDATA (33%). Serum phosphate has also had a significant improvement in October 2011. (Kruskal Wallis:  $p < 0.001$ )
- These results are all superior to the ANZDATA 2010 benchmark.
- In conclusion, there were significant improvements over 2010-2011 in calcium, calcium phosphate product and phosphate.

## HbA1C

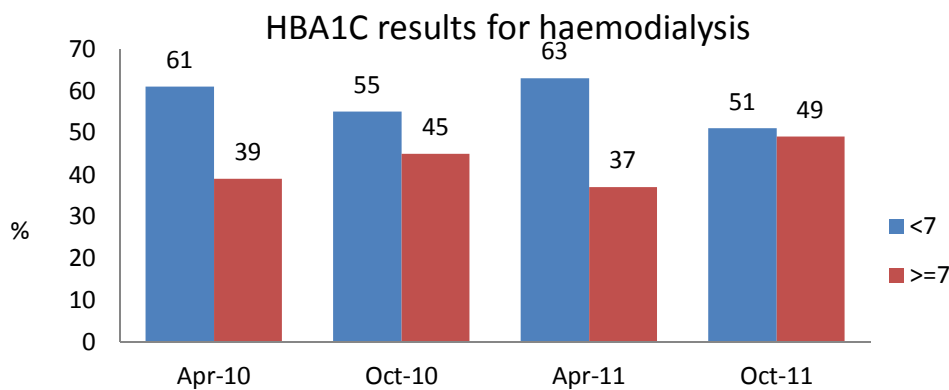


Figure 11: HbA1C results for haemodialysis

- Data on glucose control was collected on 64/137 (47%) patients with diabetes in Oct 2011 audit. There is an increasing trend for results  $> 7\%$  suggesting inadequate glucose control in this group of patients.

## Summary

- Dialysis adequacy continues to be maintained at a high level and is consistent with previous years. It remains similar to the ANZDATA 2010 haemodialysis results for URR (95%). PCR (65%) also significantly improved over 2009 through 2011.
- The unit continued to achieve better than national results in most outcome targets.
- Improvements need to be achieved to ensure better diabetes control.



## VASCULAR ACCESS

### Background and Activity level

- CARI and KDOQI guidelines advocate the preferred haemodialysis access is a native AV fistula.
- The Vascular Access Nurse assesses patients post access surgery, and provides follow up post surgery until the patient commences dialysis to assess maturity of the access.
- Data includes access used for new patients commencing their first haemodialysis in 2011 as well as current home, incenter and satellite haemodialysis patients.

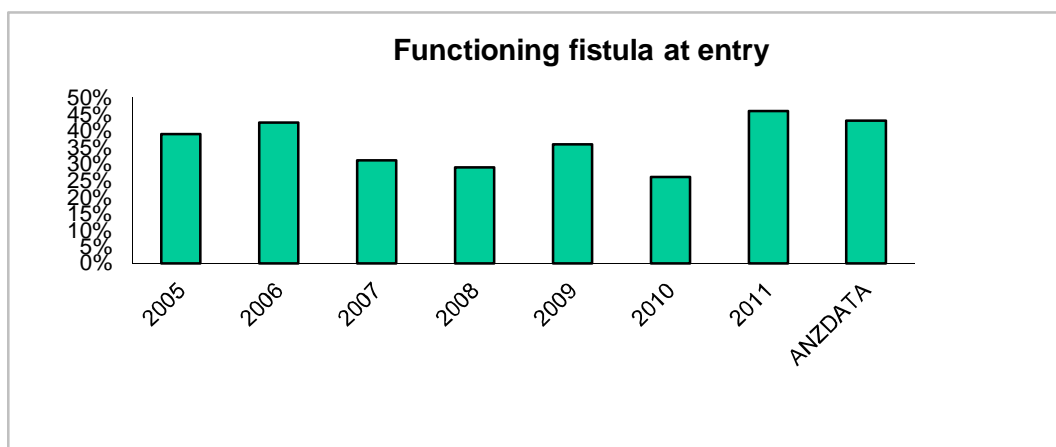
### How did we Record, Store and Analyse the Data?

- Data was collected from operation reports at St George public and private hospitals and during follow up visits.
- Data is store in the RISC database and the Access Excel database.
- Data is collected on access at first haemodialysis during 2011 and current patients' access at 31<sup>st</sup> December 2011.

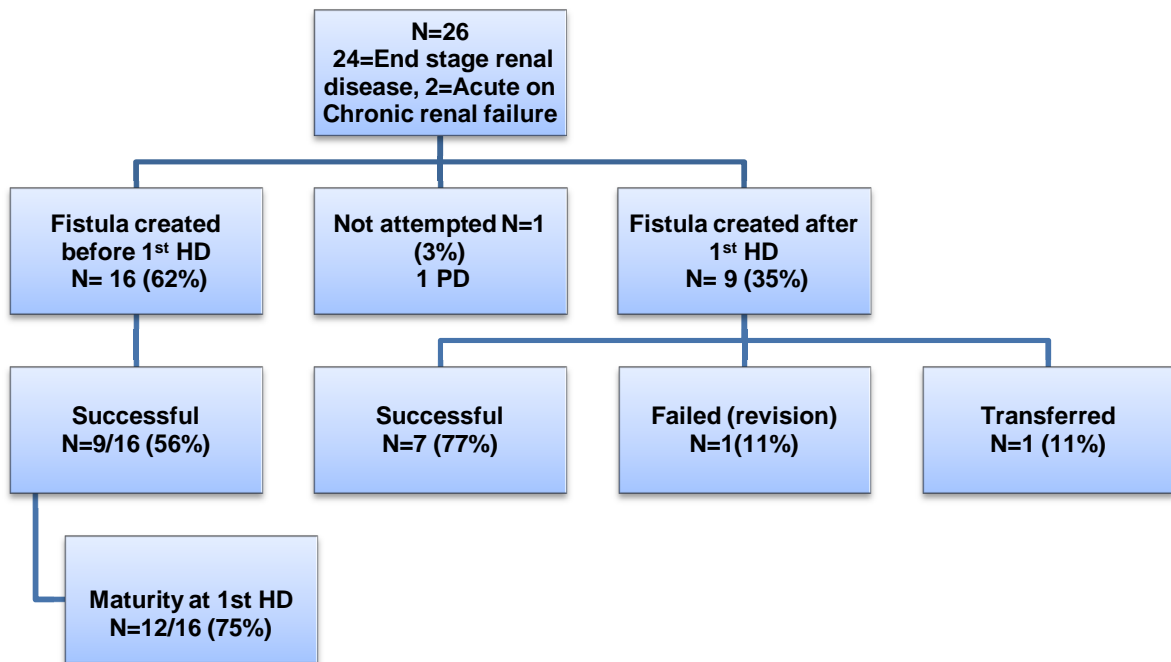
### Data Benchmark

- Data is benchmarked against ANZDATA 2010 report, KDOQI 2006 guidelines, CARI vascular access guidelines, European Best Practice Guidelines (EBPG) 2007.

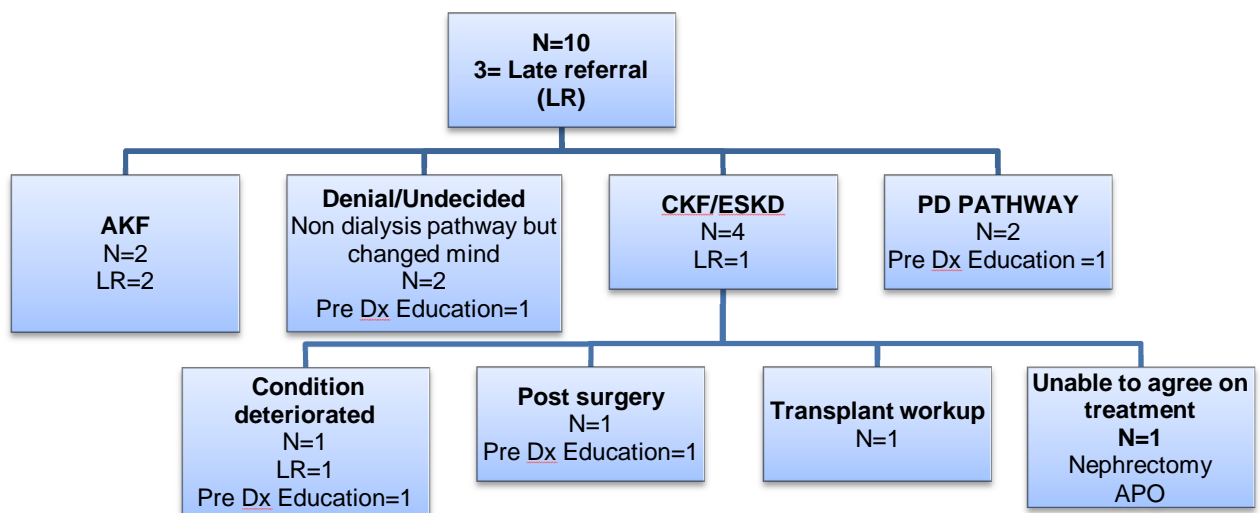
### Vascular Access at Commencement of Haemodialysis



### Fistulas in patients starting HDx 2011



### No access created before 1<sup>st</sup> haemodialysis

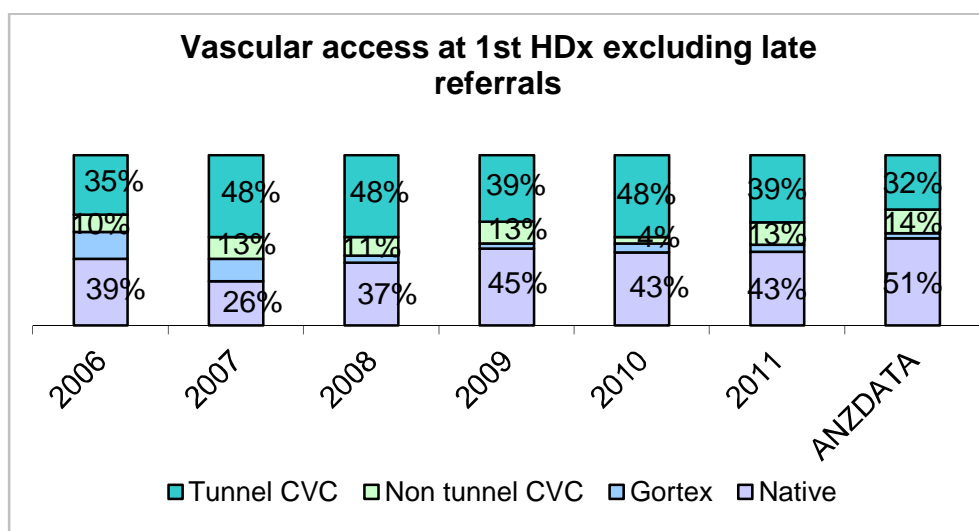


**Comments:**

- The late referral rate reflects patients who were referred to nephrologists less than three months prior to commencing dialysis. The late referral rate for St George was lower than previous years (12%) and then ANZDATA 2010 (21%).
- Ten patients (38%) had no access created before their first haemodialysis, two of who were late referrals from ARF; 2 were on the PD pathway but were in denial and presented late to clinic; 2 were undecided on a treatment option and 4 were within the chronic kidney disease or end stage category. From these 4 patients who were known to the Nephrologists, 1 was a late referral but was scheduled for access surgery which was cancelled several times due to the patients' health. One patient was being worked up for a transplant; 1 was undecided on a treatment option and the last patient developed post surgical complications.

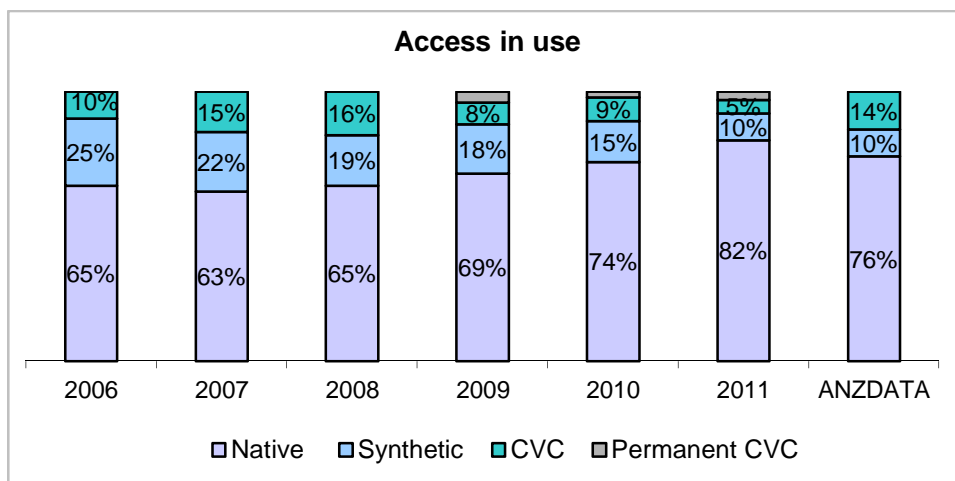
*Identified strengths and weakness:*

- The number of patients commencing HDx who were on the PD pathway has reduced due to the amount of patients receiving an acute PD catheter.
- The emphasis on centralising the access referrals through the vascular access nurse ensures the patient has an access created in a sufficient time frame. The average time from referral by the nephrologist till access creation is 39 days.



**Comments:**

- The ANZDATA 2010 (ANZDATA 2010) report indicates 51% of patients (excluding late referrals) have a functioning AVF or AVG at their first haemodialysis. Forty six percent of St George patients had a functioning fistula at commencement (excluding late referrals) in 2011.



**Comments:**

- The KDOQI 2006 evidence based practice guidelines (NKF-KDOQI 2006) recommends fistula use in 40% of prevalent patients. Eight-two percent of patients at St George have a native fistula. The number of synthetic grafts amongst St George patients has halved since 2007 which impacts on our reduced infection and thrombosis rates. This is believed to be a result of pre surgical vascular mapping to identify suitable native vessels.
- The KDOQI 2006 guidelines (NKF-KDOQI 2006) suggest <10% of chronic haemodialysis patients have a permanent catheter. Two percent of the St George population has a permanent catheter access for dialysis.
- Data from the Dialysis Outcomes and Practice Patterns Study (DOPPS) indicates the mortality risk associated with the use of a catheter (relative risk, 1.32; 95% confidence interval, 1.22 to 1.42) or graft (relative risk, 1.15; 95% confidence interval, 1.06 to 1.25) was higher than fistulas (Pisoni et al. 2009).
- The use of the Flexine synthetic grafts since 2010 has reduced the number of CVC use in prevalent patients. The advantage of these grafts is early cannulation which avoids CVC use. Although the department aims for native access first.

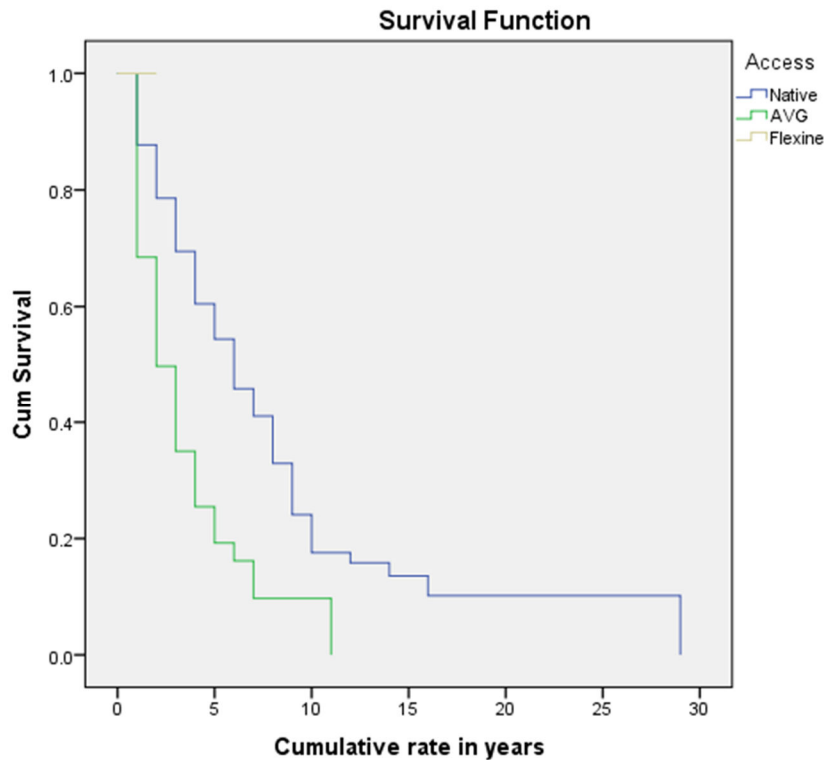
**Access Infection Rates**

	Blood stream infection (BSI) range AVF/SVG	Blood stream infection (BSI) range AVG
<b>2011</b>	<b>2 BSI (0-0.53 BSI/100 pt months)</b>	<b>4 BSI (0-4.5 BSI/100 pt months)</b>
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)

**Comments:**

- The KDOQI 2006 guideline recommends a fistula infection rate <1% and graft infection rate <10% during the use-life of the access (NKF-KDOQI 2006).
- In 2011, 2 patients with an AVG had blood stream infections (BSI) and 2 using the buttonhole technique had BSI.
- A regular bimonthly infection control review meeting continues with senior nursing staff and the infection control department, which identifies and discusses infection control issues related to the renal department.

**Access survival**



**Comments:**

- Cumulative assisted patency is defined as the number of access that remains patent regardless of the number of interventions during a time period.
- The literature indicates cumulative patency for radiocephalic fistulas of 53% at 5 years and 45% at 10 years. PTFE grafts at 1 year 67%, 2 years 50% and 4 years 43%. The KDOQI 2006 guidelines only provide rates for AVG which are 70% at 1 year, 50% at 2 and 3 years.
- The KDOQI 2006 guidelines also recommends AVG patency >2.0years (by life-table analysis) and AVF patency >3.0years (by life-table analysis) (NKF-KDOQI 2006). The median survival time (time at which half the subjects have reached the event) for St George patients AVG was 2 years and AVF 5.5 years, slightly lower than previous years.
- Data includes all current patients and deceased patients since 2004. A follow up life table was used with censored patients being those whose accesses are still functioning. The endpoint was access lost, death or transplanted or transferred with a functioning access.
- Due to the increased surveillance on permanent access within the unit, the number of access interventions our patients experience has increased from 3.7/week to 5.1/week.

Thrombosis events			
	AVF	AVG	Ave/month
2011	6	16	1.8
2010	8	21	2.4
2009	10	24	2.8
2008	14	25	3.3

**Comments:**

- The KDOQI 2006 guidelines recommend a fistula thrombosis rate of less than 0.25 episodes/pt-year at risk and graft thrombosis rate of less than 0.5 episodes/pt-year at risk (NKF-KDOQI 2006).
- The benchmark for thrombosed grafts was not met in 2011 due to multiple thrombotic events in two patients. In 2011, the unit has focused greater on identifying failing access and developing a collaborated plan with the vascular team to create another access for the patient.

*Identified limitations and strengths:*

- The increased surveillance amongst access is resulting in a reduced thrombosis rate since 2008.

**New initiatives:**

The vascular access practice development group developed a “save the vein” alert tattoo to preserve patients’ veins for future vascular access and reduce the incidence of cannulation and venepuncture of current inpatient access.

This temporary tattoo was placed on all inpatients with an access or who are preserving an arm for future access. It was also given to all home HDx patients and predialysis patients with an access for self-application if they require admission.

**Future plans:**

- Establish a weekly vascular access clinic where the vascular access CNC will provide surveillance and review for all patients with a permanent access.
- Continue the quarterly vascular access meetings with the surgical team.
- Continue bimonthly renal infection review meeting with the infection control nurses.
- Continue the vascular access practice development group with the dialysis nurses which produces the bimonthly vascular access newsletter detailing protocol updates, unit progress and new initiatives in vascular access.
- Liaise with the emergency triage staff to facilitate the application of the vascular access alert tattoo on any patients presenting to emergency.

## CENTRAL VENOUS CATHETERS

### Background

- Central venous catheters (CVC) are required to provide temporary access for haemodialysis patients
- Data relates to patients with acute kidney failure requiring haemodialysis as well as end stage kidney failure patients.
- Infection and complication rates of CVC are monitored and reported.

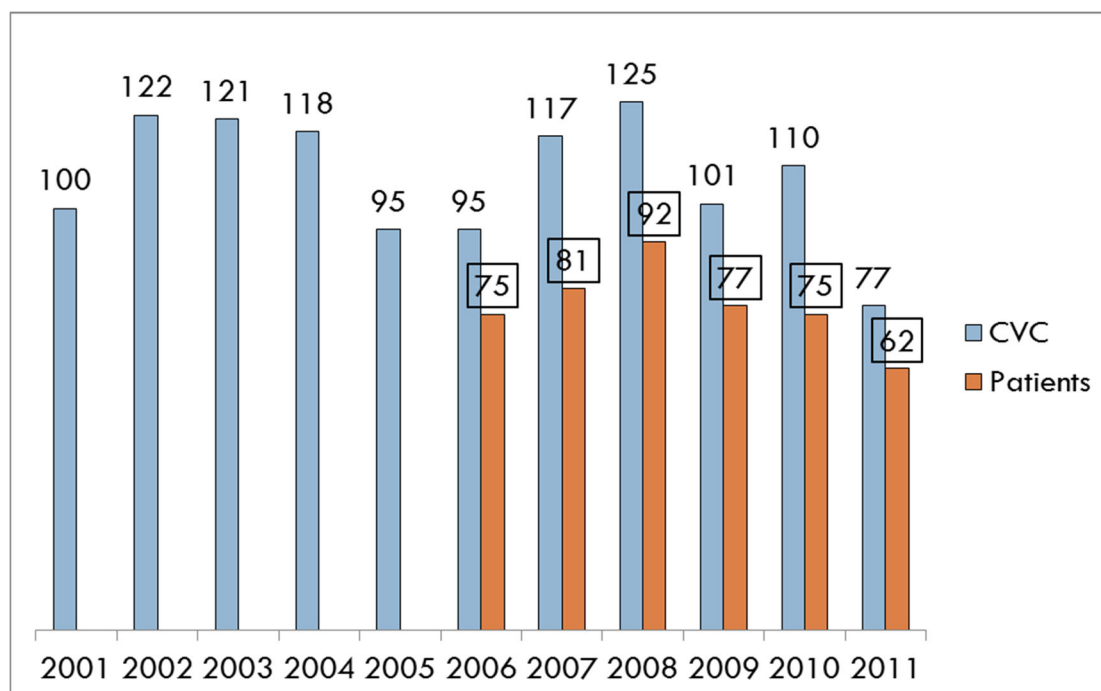
### How did we Record, Store and Analyse the Data?

- Data is collected and entered into the access Excel database, which includes reason for insertion and removal, insertion site, type of catheter, number of catheters per patient and complications.

### Data Benchmark

- Data is benchmarked against ANZDATA 2010 report and the KDOQI 2006 guidelines.

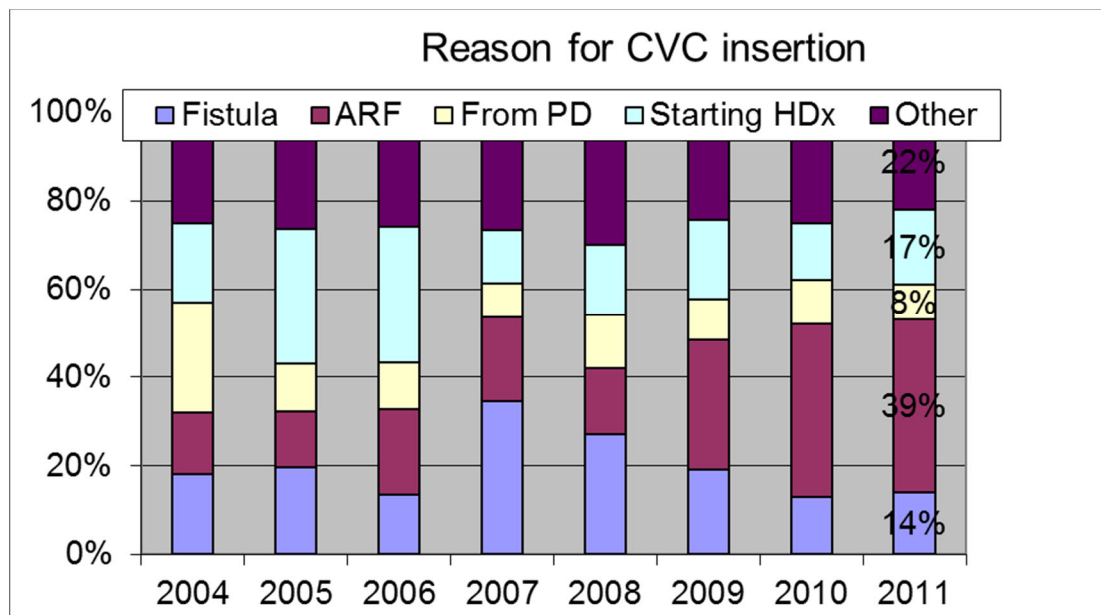
### Activity Level



### Comments:

- The number of catheters inserted for haemodialysis has reduced from year 2010 due to less ARF patients. The type of catheters inserted in 2010 remains predominantly Bard hemi-glide tunnelled cuffed internal jugular catheters (67%). The remainder catheters were predominately Arrow non-tunnelled femoral catheters.

## Reason for insertion of catheters



### Comments:

- The requirement of CVC insertion related to fistula complications and to commence haemodialysis continues to reduce.
- The number of patients transferring from PD and requiring a CVC was similar to previous audits.
- Other includes replacing a non-tunneled catheter with a tunneled, malfunction of the catheter, occlusive thrombus and replacing an infected catheter.

### Complications related to insertion

- There was a decrease rate of catheter malfunctioning in 2011 (2%) compared to the previous audit in 2010 (8%). This is largely due to less ARF patients requiring non tunneled catheters.
- The number of tunneled CVC that bleed post insertion has continued to decrease in 2011.
- There were no insertion related complications in 2011.



## Catheter infection rates

	Catheter related bacteraemia (CRB) rate	Exit site infections (ESI) rate
2011	1% (0.18 episodes/1000 catheter days)	6% (0.91 episodes/1000 catheter days)
2010	4% (0.72 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)

### Comments:

- The use of the gentamicin/heparin lock continues to reduce catheter related bacteraemia rates. There were no infections amongst femoral inserted non-tunnelled catheter in 2010 and 2011.
- The KDOQI 2006 guidelines recommend tunnelled catheter related infections <1.5 episodes/1000 catheter days, <10% at 3 months and <50% at one year (NKF-KDOQI 2006). In 2011 St George has met the KDOQI benchmarking for tunnelled catheter related infection at (1%).
- Gentamicin levels are monitored randomly in all patients with CVC with all results <0.2mg/L indicating no toxicity. There were no gentamicin resistant organisms detected in this group.
- The number of exit site infections continues to be similar to previous years. There were 5 episodes of exit site infections amongst 3 patients. Two of these patients often presented to the unit without a dressing covering the exit site insitu.
- The only CRB in 2011 was caused by a yeast organism and the main causative organism for ESI was staph aureus.
- The average numbers of days femoral catheters were insitu has reduced to 5 days since 2009. The average number of days a tunnelled catheter was insitu in 2010 was 83 days compared to 107days in 2009.

### Identified limitations and strengths:

- The regular monitoring and surveillance of vascular access through performing a vascular access risk assessment or ultrasound to detect early access complications continues to impact on the number of CVC inserted.
- The ability of the Vascular Access Nurse to autonomously order a CVC removal on EMR continues to ensure the prompt removal of CVC and hence impacts on infection rates.

### Future plans:

- Conduct a lower dose heparin lock research project to reduce the incidence of bleeding post CVC insertion.
- Continue bimonthly renal infection review meetings with the infection control nurses.

## Acceptance onto dialysis

Written by Kristy Roh

Out of 47 new patients who started dialysis in 2011, 21 patients commenced peritoneal dialysis and 26 commenced haemodialysis. Patients are analysed according to their first mode of dialysis only and must have had dialysis >30 days on their first modality.

- In 2011 there was four late referral for peritoneal dialysis (19%) and three late referrals for haemodialysis (12%). This is an improvement for HD from (40%) late referral rate last year.
- Mean age at commencement of PD was 63 years in 2011 and for HD 65 years. This was older than 2010.
- ANZDATA 2010 results show an increase in 46-64 year age group in haemodialysis and less people commencing haemodialysis aged >75 years. At STG, both PD and HD new patient groups (2009-2011) were older than the ANZDATA 2010 in 75-84 year age group.

### Age group of new patients.

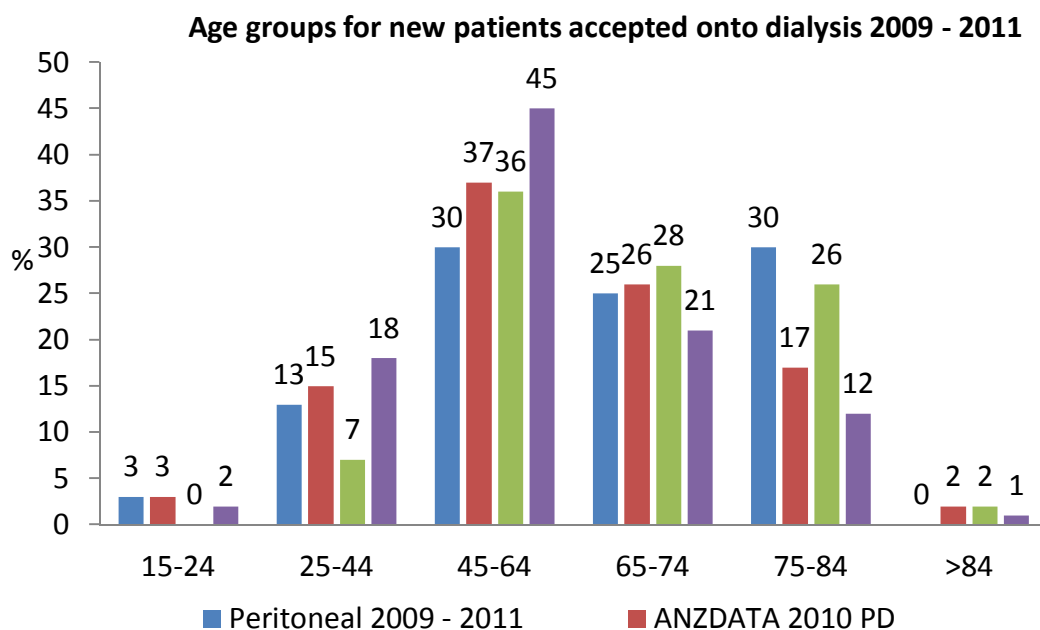


Figure 12: Age group of new patients accepted onto haemodialysis and peritoneal dialysis

## Glomerular Filtration rate (eGFR)

An e GFR is obtained from the biochemistry blood serum results taken immediately prior to commencing dialysis.

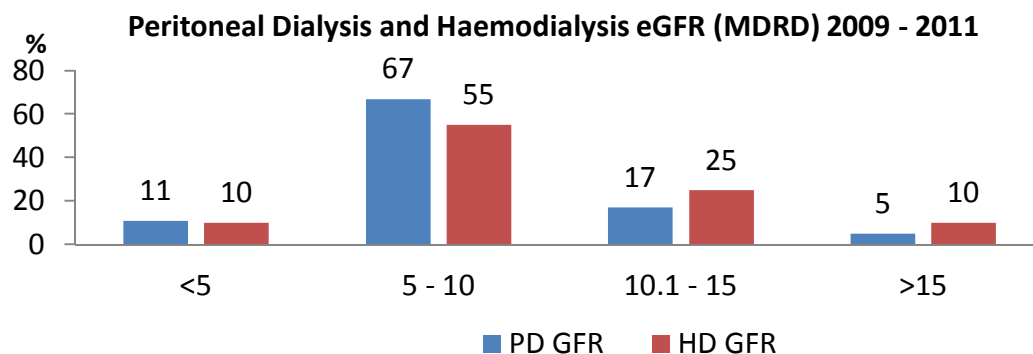


Figure 13: e GRF on commencement of dialysis

## Baseline Characteristics of new dialysis patients

Table 8: Baseline BMI of new dialysis patients

St George Hospital new patients*		PD 2009 - 2011	HD 2009 - 2011
Body Mass Index (kg/m)	<20	5	7
	20-24	35	23
	25-30	28	23
	>30	33	48

Table 9: Breakdown of baseline characteristics of new dialysis patients compared to ANZDATA

Higher BMI is associated with higher rates of technique failure and death in Australia and

		St George Haemodialysis 09-11 (n=96*)	HD ANZDATA 2010	St George Peritoneal dialysis 09-11 (n=63*)	PD ANZDATA 2010
Age	(Average age in years)	65.2	60.7 <sup>†</sup>	62.8	60.7 <sup>†</sup>
Gender	Male	68%	61% <sup>†</sup>	59%	61% <sup>†</sup>
	Female	32%	39% <sup>†</sup>	41%	39% <sup>†</sup>
Late Referral	(< 3 months before first treatment)	36%	22% <sup>†</sup>	11%	22% <sup>†</sup>
Co-morbidities	Smoking (Current and former)	47%	54%	42%	53%
	Chronic Lung Disease (yes and suspected)	17%	17%	2%	14%
	Cerebrovascular Disease	1%	16%	9%	14%
	Coronary Artery Disease	43%	45%	39%	39%
	Peripheral Vascular Disease	21%	30%	8%	22%
	Diabetes	52%	49%	45%	42%

New Zealand. (ANZDATA Registry 2004 Report: Pg 60) **BMI <20 indicates underweight, 20-25 normal, 26-30 overweight and >30 is obese.** \*Excludes patients who had haemodialysis prior to peritoneal dialysis.

## **Summary:**

The BMI of new dialysis patients is increasing. A BMI >30 is 5% higher than for the results from 2009-2011 for HD. The BMI >30 has remained the same PD group for the same time period.

(67%) PD patients and (55%) HD patient have eGFR rate of 5-10 immediately prior to commencing dialysis between 2009-2011. Less patients are commencing dialysis at the eGFR >15 (5%) PD and (10%) HD between 2009-2011.

The late referral rate has improved remarkably for HD from 40% in 2010 to 12% in 2011. This can be contributed by review of the late referral patients from 2010 at the renal meeting to discuss the reasons to improve late referring of the patients.

However PD late referral has been increased to 19% in 2011 from 6% in 2010. This rate still meets ANZDATA standards (ANZDATA target <22%).

## **Future plan**

Patients should be referred for pre dialysis education in a timelier manner.

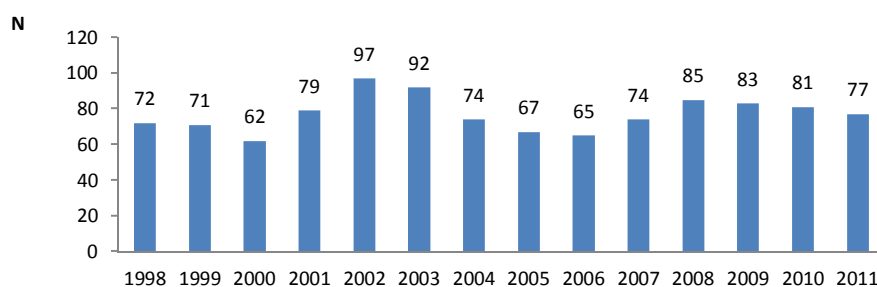
Weekly review of the pre dialysis patients commenced in February 2012 at the renal department meetings. It aims to prevent commencement of the new dialysis patients without a functioning vascular access.

## Peritoneal Dialysis

Written by: Kristy Roh

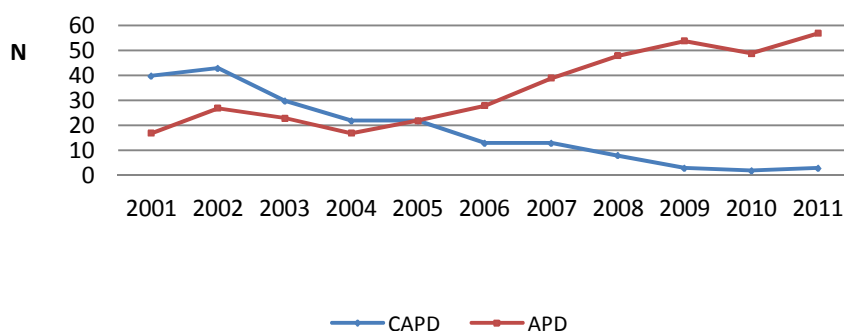
The peritoneal dialysis (PD) unit has continued to have a small decline in the number of prevalent and incident patients in 2011 with a net gain of 9 patients. A total of 77 patients were treated on PD during the year (including hospital IPD) compared to 81 in 2010, 83 in 2009, 85 in 2008 and 74 in 2007. In December 2011 the proportion of patients receiving automated peritoneal dialysis (APD) was 95%, and the proportion of continuous ambulatory peritoneal dialysis (CAPD) was 5%. Our APD population is still over and above the proportion reported by ANZDATA of 59%. This has been a deliberate strategy to enhance the appeal of PD for our patients thereby increasing the number of home patients.

**Total persons (prevalent and incident) on peritoneal dialysis**



**Figure 14: Total patients who received peritoneal dialysis at any stage during each year**

**CAPD/APD patient trend over the years**



**Figure 15: Number of patients on each modality at December 31<sup>st</sup> each year**

### The ANZDATA 33<sup>rd</sup> Annual Report 2010 (data to Dec 2009)

ANZDATA results show an increase in the prevalence of people using automated peritoneal dialysis (APD), up 2% Australia wide. In December 2011, the St George peritoneal dialysis unit the numbers of patients on automated peritoneal dialysis, decreased by 1% from 2010 while the CAPD population slightly increased; by 1% from December 2010.

**Table 10: Proportion of patients on each PD modality compared to ANZDATA**

<b>APD</b>	ANZDATA 59% (1293/2177)	St George 95% (57/60)
<b>CAPD</b>	ANZDATA 41% (884/2177)	St George 5% (3/60)

## PD Patient Flow

Balance carried forward: Peritoneal dialysis patients as at 01.01.2011 (n=51)

In	New Patients	21	
	New patient transfer from Haemodialysis	4	
	Returns from HD	1	
	On hospital IPD	0	
	<b>In Subtotal</b>		<b><u>26</u></b>
Out	Transplants	1	
	Transfer to other units	0	
	Transfer to Home Haemodialysis	0	
	Temporary Transfers to Haemodialysis	1	
	Permanent Transfers to Haemodialysis	11	
	Return of renal function	0	
	Withdrawal from dialysis	0	
	Deaths on PD	4	
	<b>Out Subtotal</b>		<b><u>17</u></b>
	<b>Net gain</b>	<b>9</b>	
	<b>PD patients Dec 2011</b>		<b><u>60</u></b>

## Change of modality and deaths

Table 11: Peritoneal Dialysis activity rates using ANZDATA for comparison

	St George 2009 (%)	St George 2010 (%)	St George 2011 (%)	ANZDATA 2010 (%)
Transplants	5	4	2	7
Change to haemodialysis	16	41	17	26
Deaths on Dialysis (PD)*	23	18	7	14

Note: The rates are calculated using the total number of patients on peritoneal dialysis at 31.12.2011 (n=60), the method used by ANZDATA to calculate their rates.

Patients changed to haemodialysis for a variety of reasons; failed PD (n=5), social reason (n=1), infective reasons (n=3), other medical (n=2).

The STG percentage of deaths on peritoneal dialysis was lower (7%) than the ANZDATA Australian rate (14%). The St George withdrawal rate was 0% in 2011 this rate cannot be compared to the ANZDATA 2010 report as this data is not reported.

The percentage of transfers to haemodialysis decreased by 24% from 2010 and is lower than the transfer rate reported by ANZDATA 2010. This can be explained by less number of patients with membrane failure, surgical and pleural leaks in 2011 than previous years.

## **PD Adequacy, Biochemical and Haematological targets**

### **Aim**

1. To compare dialysis adequacy using haematological markers, biochemical markers and Kt/V with previous audits; October '11 (61) , April '11 (57), October '10 (47), April '10 (53), October '09 (54), April '09 (56). These are performed at 6-month intervals as per the CARI recommended guidelines with the exception of dialysis adequacy, which is conducted annually in October unless required earlier.
2. To ensure all patients have had a PET test performed to establish a baseline membrane transporter status.
3. To provide members of the renal team with individual patient's dialysis adequacy and biochemical and haematological marker results.

### **Background**

An audit of biochemical and haematological markers and dialysis adequacy (Kt/V) was conducted 6 monthly for the current dialyzing PD patients and compared to previous audits.

### **Method**

The CAPD clinic nurses and consultant renal physicians arrange the collection LFT, UEC, FBC, Iron studies, PTH, Mg, Ca, PO<sub>4</sub> and Lipids as per the routine monthly protocol for blood investigations for PD patients. Kt/V testing was coordinated by the CAPD nurses as per protocol as was the PET testing. These results are compared to the previous year and measured against the benchmark set by the CARI guidelines (CARI 2006). If any action is required, a meeting is organised with the peritoneal dialysis unit and actions are taken to resolve issues.

### **Peritoneal Dialysis Adequacy**

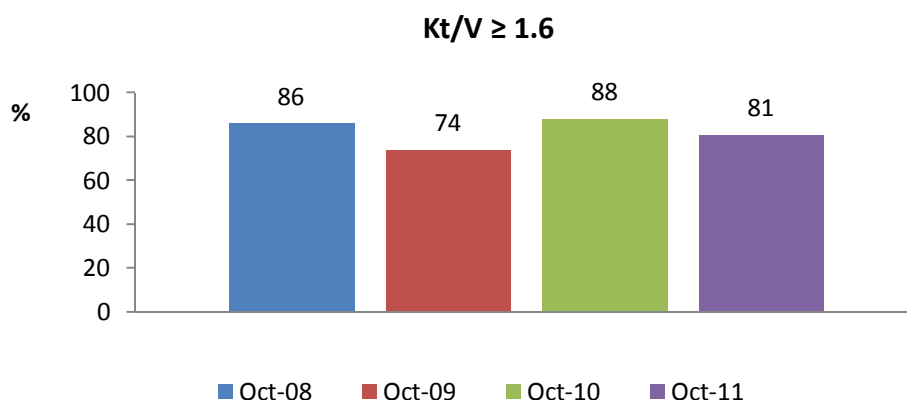


Figure16: Percent of patients who achieved a Kt/V ≥ 1.6

Table 12: Percent of peritoneal dialysis patients falling within the target range

Parameter	Target	Apr 10	Oct 10	Apr 11	Oct 11	ANZDATA 10
Ca	2.25-2.58 mmol/L	53	53	46	56	
Corr Ca	2.1-2.4 mol/L	30	28	32	31	-
PO4	0.8-1.6 mmol/L	49	39	40	36	47
CaPO <sub>4</sub>	<4.0 mmol/L	55	43	49	47	63
Ferritin	200-800 ug/L	48	66	53	56	53
Fe Sats	20-50%	56	76	59	69	70
Mg*	0.74-1.03 mmol/L	51	71	63	61	-
Albumin*	33-48 g/L	28	45	39	41	-
Bicarbonate	20-30 mmol/L	94	92	84	78	-
PTH	10-42 nmol/L	63	62	59	48	
KT/V	≥ 1.6	-	88	-	81	-
CCL	>50L (L & LA) or >60L (H & HA)		73		59	-

## Albumin

- Albumin showed statistically significant improvements in 2011. Forty one percent (PD) patients within albumin level 33-48 g/L compared to (28%) in April 2010. There is no explanation for the significant variation in albumin results over the time period.

## Serum Calcium

- Calcium results show slight improvement in Oct 11 compared to Oct 10 and they continue to match ANZDATA results. The Oct 11 average calcium was 2.28 mmol/L compared to 2.21 mmol/L in April 10. There was no statistical significance.

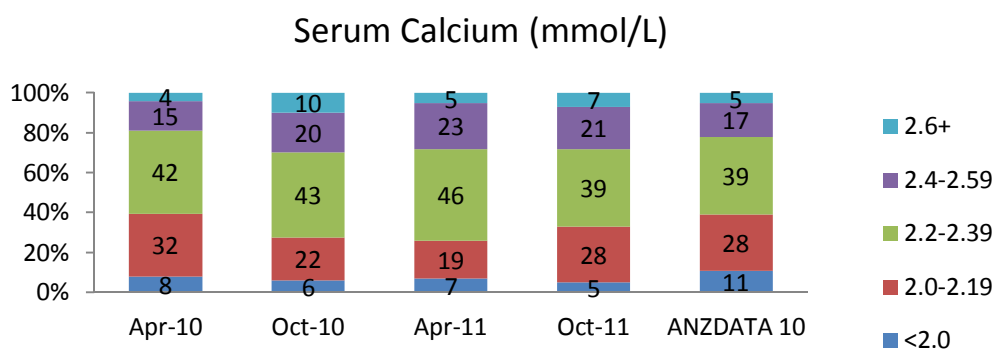


Figure 17: Serum Calcium compared to ANZDATA



## Calcium Phosphate Product and Phosphate

- Calcium Phosphate product and the Phosphate results were worse than ANZDATA results in Oct 2011. This correlates with the overall worsening of phosphate and the Calcium Phosphate control. The results are not statistically significant using Kruskal Wallis. There was no clear explanation for this fact.
- The mean Phosphate result in April 11 was 1.7 mmol/L and in October 11 it was 1.79 mmol/L.

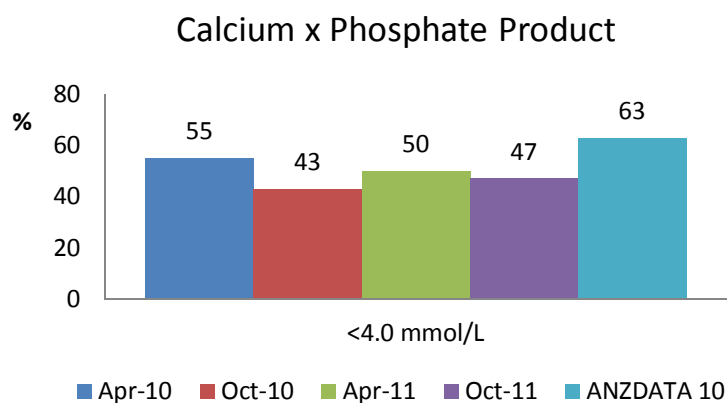


Figure 18: Calcium x Phosphate Product results compared to ANZDATA

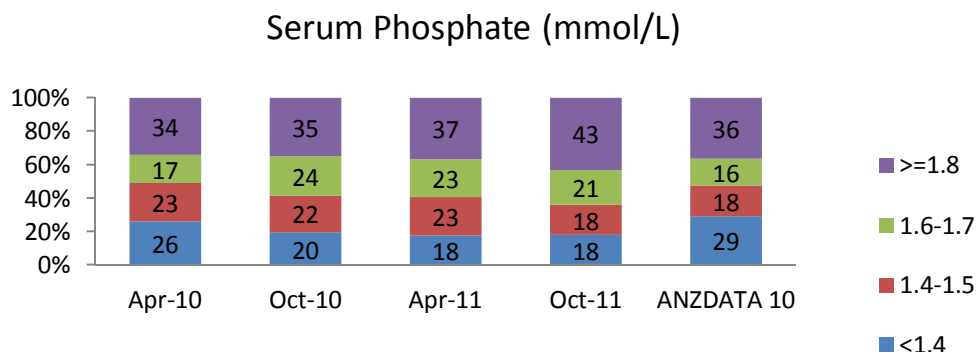


Figure 19: Serum Phosphate compared to ANZDATA

## PTH

- In October 2011, 48% (26/54) of peritoneal dialysis patients had PTH within 10-42 nmol/L.
- The maximum recorded PTH in October '11 was 169, the mean was 34.06 (median 24.3) nmol/L.

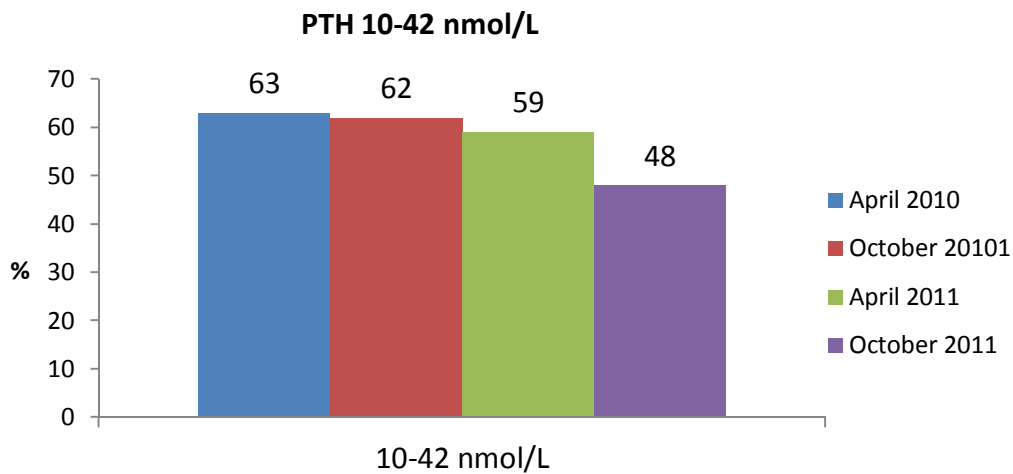


Figure 20: Percent of peritoneal dialysis patients with PTH 10-42 nmol/L

## Iron

- The CARI guidelines recommend the administration of supplementary Iron to prevent iron deficiency and to achieve and maintain an Hb concentration of 110-120 g/L (CARI 2006), with or without the use of an erythropoiesis-stimulating agent.
- Bolus administration of IV iron (Ferrosig 500mg) is easy to administer and is the treatment of choice in the St George renal unit. The Ambulatory Care unit administers this by appointment after the patients have been prescribed the drug by the renal registrar or consultant.
- Nurse initiation of this process commenced in early 2008 continues to be an ongoing project.
- Forty five (45%) percent had normal Iron studies in Oct 2011 compared to 81% in Oct 2010.
- Less than 20% PD patients had <20 Iron saturation than ANZDATA 2010.
- There is no statistical significance in the improvement seen in Ferritin over 2010 and 2011

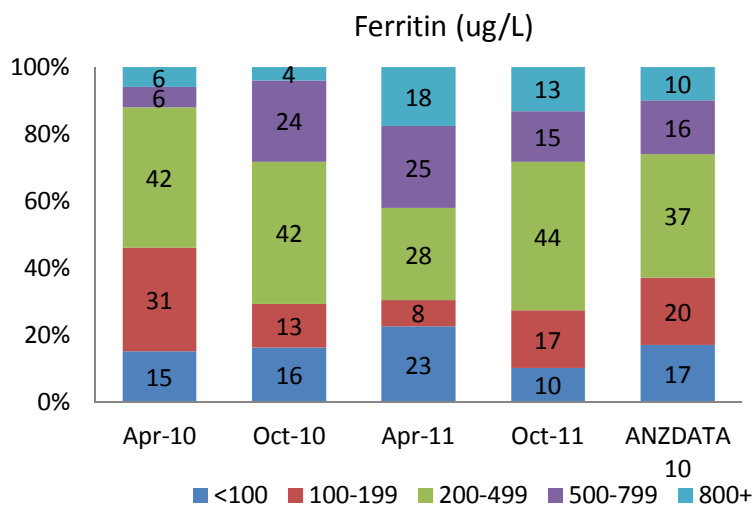


Figure 21: Peritoneal dialysis Ferritin results compared to ANZDATA

### Iron Saturation (Tsat)

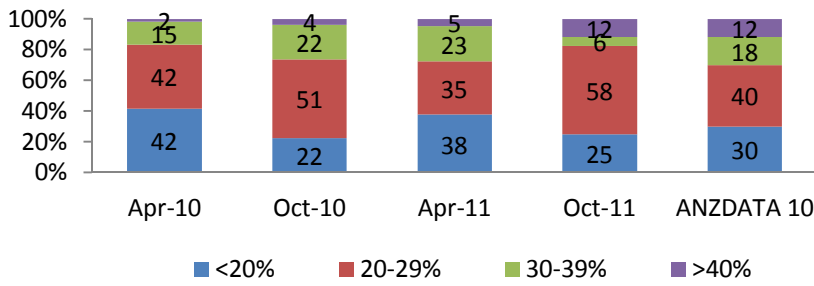


Figure 22: Peritoneal dialysis Iron Saturation results compared to ANZDATA

### Haemoglobin

#### Haemoglobin (all PD patients) g/L

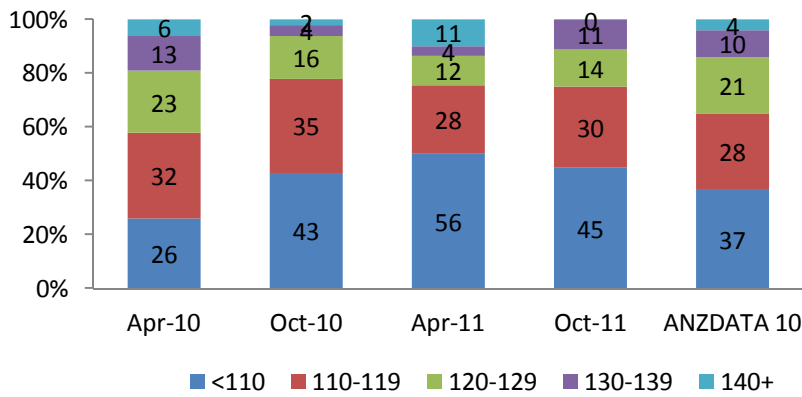


Figure 23: Haemoglobin results for all PD patients

#### Haemoglobin - PD patients with Coronary Artery Disease

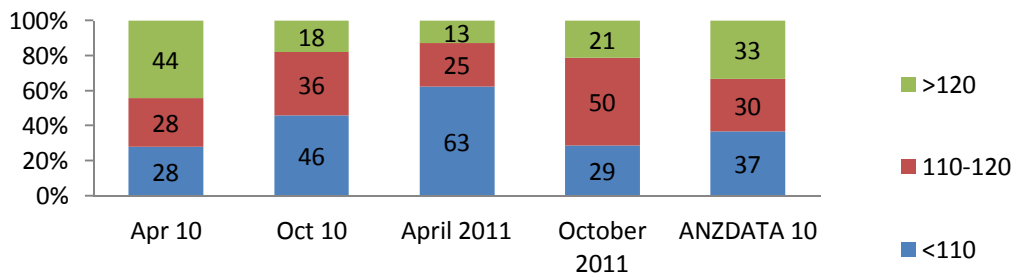


Figure 24: Haemoglobin results in peritoneal dialysis patients with coronary artery disease

## Haemoglobin - PD patients without Coronary Artery Disease

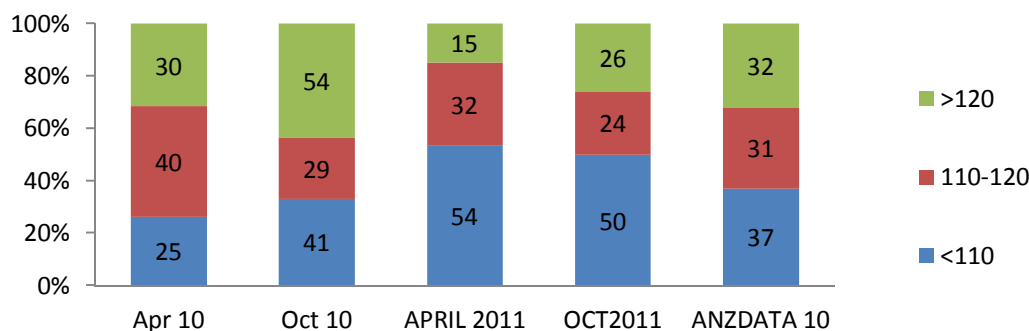


Figure 25: Haemoglobin results in peritoneal dialysis patients without coronary artery disease

Haemoglobin (Hb) has been examined using cardiovascular disease (CAD) as a determining factor.

- The October 2011 (Hb) in all PD population showed similar result to the last year in the percent of patients with haemoglobins both <110 and >120. Less patient with 110-120 g/L (30%) than (35%) in 2011, however these results are still better than ANZDATA 2010 (28%).
- In October 2011, 15/61 (25%) patients were known or suspected of having coronary artery disease (CAD).
- Analysis of haemoglobins in (CAD) reveal, patients with haemoglobin <110g/L has decreased in Oct 2011 (29%). Additionally, patients within the recommended target of 110-120 g/L also increased in Oct 2011(50%) compared to ANZDATA 2010 (30%). There was a reduction in patients with a haemoglobin <120 g/L.
- Non CAD patients demonstrated a large variation of results over 2010/2011. April 11 showed 32% of patients within the recommended range of 110-120 g/L which reduced in October 11 to 24%. These results are difficult to explain.
- Patients without CAD have lower haemoglobins than those reported in ANZDATA 2010 while those with CAD have higher haemoglobins compared to ANZDATA. Fifty percent of patients without CAD had haemoglobin <110g/L compared to patients with CAD (29%). Only 24% non CAD patients with the recommended target Hb 110-120g/L compared to 50% in CAD patients.
- Monthly patient case management meetings with individual nephrologists and nursing staff continue to be an ideal time to ensure PD patients haemoglobin, ESA therapy, and other biochemical and adequacy markers, are managed more effectively.

## HbA1c (Glycosylated Haemoglobin)

In 2011 we showed an improvement in glucose control in the diabetic patients on APD, 71% had HbA1c <7 versus 62% in 2010. Evidence in non-dialysis research suggests an HbA1c <7 is considered the benchmark. There remains uncertainty about the optimal HbA1c target as well as its value as a measure of diabetes control on dialysis. This is because of the variability of Hb in dialysis patients.

HbA1c results in PD patients

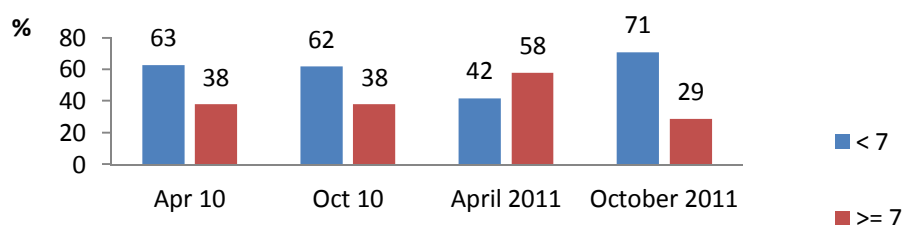


Figure 26: HbA1c results in peritoneal dialysis

## Lipids

Lipid studies were collected for the 'high-risk' patients. This includes those patients having or suspected of having diabetes, coronary artery disease, cerebrovascular disease and peripheral vascular disease. Forty four percent (44%) (n=27/61) of PD patients were classified as high-risk in October 2011. Lipid study results showed improvements in their biochemical markers which included cholesterol, triglycerides, HDL and LDL over 2011. Improvements were not statistically significant.

Lipids in high risk patients only

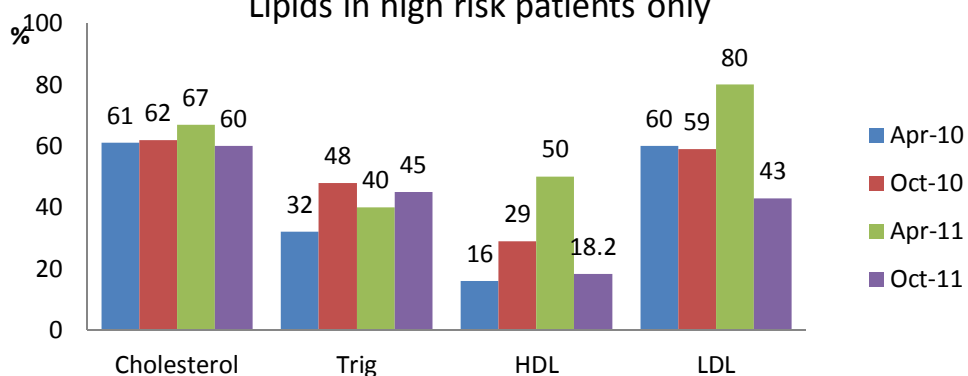


Figure 27: Lipid results in high risk peritoneal dialysis patients (any ANZDATA co morbidity excluding chronic lung)

## Infections in Peritoneal Dialysis

### Aim

1. Identify peritonitis rates and exit site infection rates in the peritoneal dialysis population, expressed as incidence per patient month, peritonitis free dialysis time and number of episodes per patient years.
2. Identify number of episodes per patient.
3. Identify causative organisms.

### Background

Data on peritoneal infections are collected using the RISC and POET databases, and a review of the patient records. These statistics are collected retrospectively on a yearly basis and compared to the previous results.

### Method

1. Peritonitis Episode Forms from ANZDATA are used to collect peritonitis information (organism, treatment, admission) regarding every peritonitis event. This data is then analysed using a statistical program. Patient records are reviewed for exit site infections.
2. Recurrent infections, defined as 'within four weeks of the last antibiotic dose (or within five weeks if intermittent Vancomycin used) for the same organism' (ANZDATA 2008).
3. Recurrent peritonitis infections are included from 2009 onwards in this report; previously they were excluded as per the NSW Health method of calculating infection rates per 100 patient months (NSW Health, 2005).

### Outcomes

- The rates of infections from 1999 to 2011 continue to show improvement.
- Main causative organisms for peritonitis infections in 2011 gram negative organism and no fungal infection in 2011.

Table 13: Infection rate over time

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total patients	71	62	79	97	92	74	67	65	74	85	83	81	77
Peritonitis episodes	81	69	45	51	62	42	34	40	30	33	33	16	14
Patients with at least 1 episode of peritonitis	n=42 59%	n=26 42%	n=26 33%	n=37 38%	n=38 41%	n=32 43%	n=31 46%	n=28 43%	n=21 28%	n=22 26%	n=21 25%	n=15 19%	n=14 18%
Patients with at least 1 episode of Exit site infection	n=43 60%	n=33 53%	n=21 27%	n=32 33%	n=38 41%	n=14 19%	n=16 24%	n=14 22%	n=12 16%	n=12 14%	n=13 16%	n=16 20%	n=16 24%

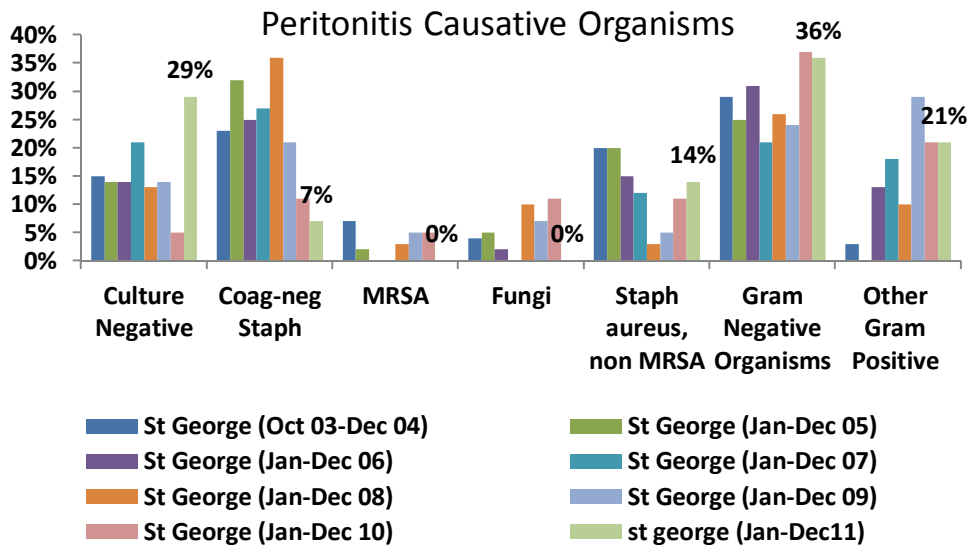


Figure 28: Peritonitis causative organisms

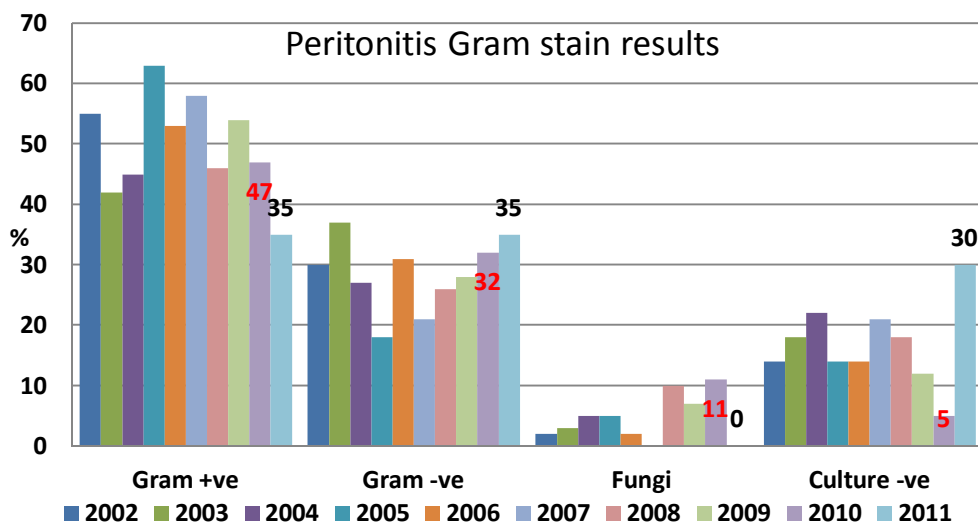


Figure 29: Peritonitis Gram Stain results

### Change of treatment as a result of peritonitis

The peritonitis data is measured to determine the rate of transfer to haemodialysis *as a direct result of peritonitis*. The results are listed in the following table:

Change in treatment as a direct result of peritonitis (%)	2006	2007	2008	2009*	2010*	2011*
Interim Haemodialysis	9	10	6	0	6	0
Permanent Haemodialysis	13	13	18	15(5/33)	24 (4/17)	14 (2/14)
Catheter removed	22	20	24	15 (5/33)	41 (7/17)	14 (2/14)

\*includes recurrent infections

## Peritonitis episodes and rates

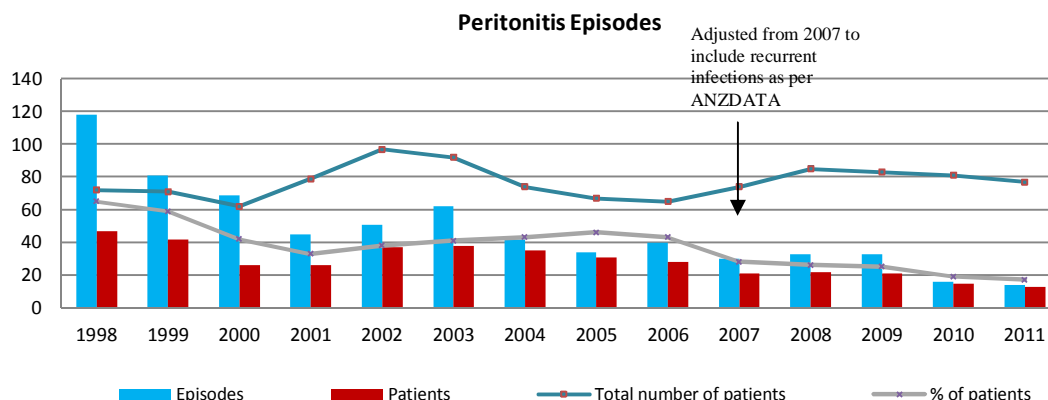


Figure 30: Peritonitis Episodes since 1998

- The number of episodes of peritonitis and the number of patients who had peritonitis over the years 1998 – 2011 has shown progressive improvement. There are considerably less infections since the commencement of data collection in 1998. This can be attributed to better connection systems and patient training. Since data collection commenced we have been able to objectively examine change over time.
- The proportion of peritoneal dialysis patients who are 3 years peritonitis free has increased again to 69%. This is related to the increase in number of patients who have been on peritoneal dialysis greater than 3 years.

### Proportion of patients 3 years peritonitis free

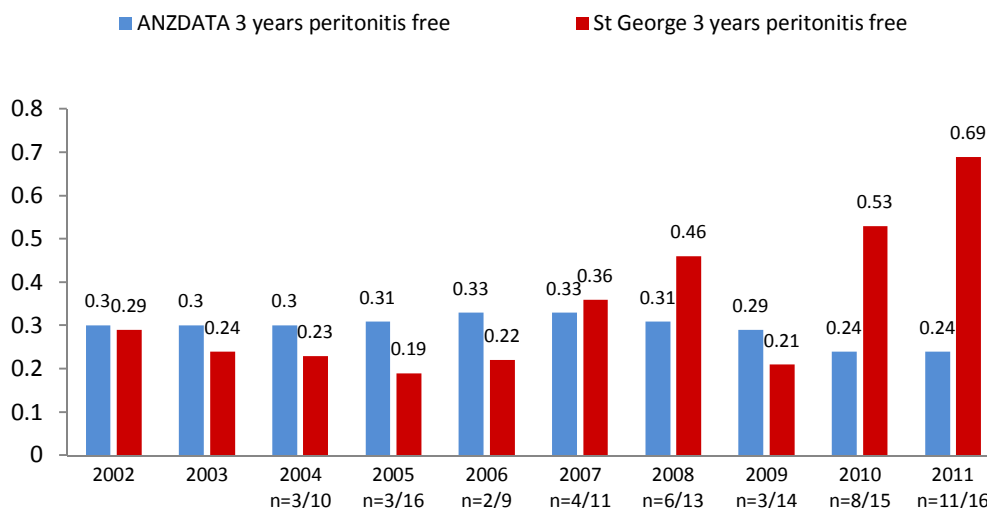


Figure 31: Proportion of patients' peritonitis free at 3 years compared to ANZDATA



### Patient months per episode of peritonitis

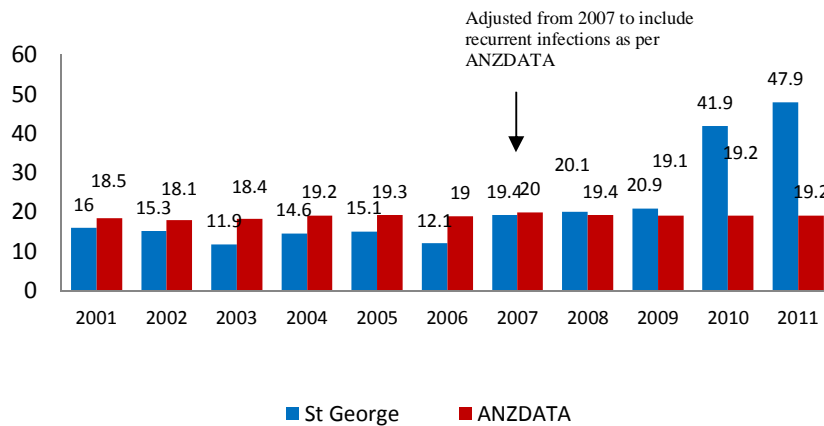


Figure 32: Peritonitis Rates

- Patient months per episode of peritonitis compared to ANZDATA Australian results up until 2009 but significant improvements have occurred since 2009. The peritonitis rate over the past 3 years, 2009–2011 is now 1/32.3 months. ANZDATA 2010 reports the APD rate at 1 per 21 months, St George APD rate in 2011 is 1 per 47.9 patient months. ANZDATA peritonitis free survival is calculated from the date of first peritoneal dialysis to the date of first peritonitis.

### Summary

- ANZDATA results are the benchmark used for comparison with St George results. The peritonitis incidence per patient months has improved to 1/47.9 months. This better the benchmark set by the Australian 2010 ANZDATA results.
- The percentage of patient's peritonitis free at 3 years has increased to 69% from 53% from 2010.
- Bi-annual patient newsletter continues to be effective in ongoing education for the patients.
- The social worker and the PD staff organised "People on PD support group" on Oct 2011 at the Kogarah RSL. The session provided an opportunity to address their existing concerns and to promote an educational forum for the PD patients. The session received positive feedback from the PD support group.
- Local insertion of the Tenckhoff catheter commenced in 2009 to assist patients who are on a PD pathway allowing them to commence dialysis in a prompt manner and without having to start on haemodialysis if decline in renal function was rapid or they were a late referral.
- Patient exit site survey has been attended in 2011 in order to analyse the current exit site care practices by the PD patients. The survey results will be analysed to ascertain what techniques would be best and what exit site practice will mean less infection rates. However, exit site survey results are for interpretation at this stage only.

## Future plans

- Biannual patient satisfaction surveys.
- Development of our Local Anaesthetic insertion of PDC pathway.
- Annual “People on PD support Groups “to continue.
- Annual Allied health talks for the PD patients.
- The annual review of PD policies to continue, in the aim to keep it in line with ISPD best practice guideline.
- Patient exit site survey results to be analysed.
- Six monthly home visits to be re-established.
- Ongoing “Glitterbug” hand hygiene QA project to assess PD patients hand hygiene practice when training. This QA project commenced in 2011 in order to improve infection rate, hence results to follow.

## Exit Site Infections (ESI)

The following graphs represent the exit site swab results from 2005 to 2011 and the numbers of patients / episodes of exit site infection. Exit site infections have reduced considerably since data collection began in 1998. There are considerably less repeat infections and a continual decline in the percent of patients who have infections was seen until 2011. The percent of patients who acquire an ESI reached a plateau in 2009 and slightly increased in 2011.

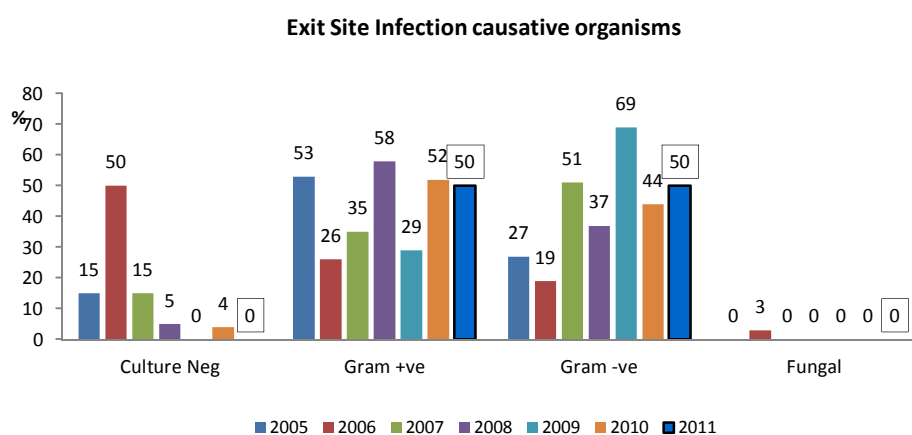


Figure 33: Exit site infection causative organisms

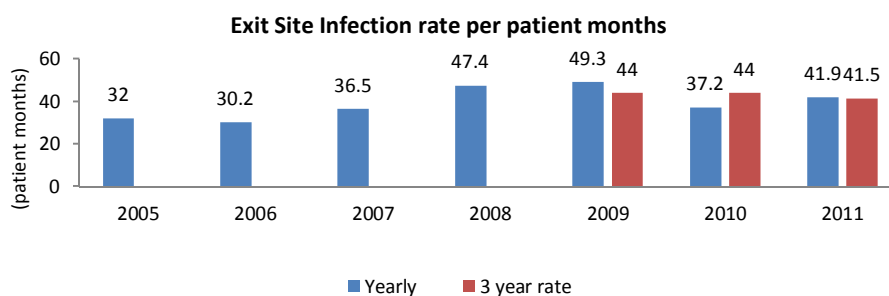
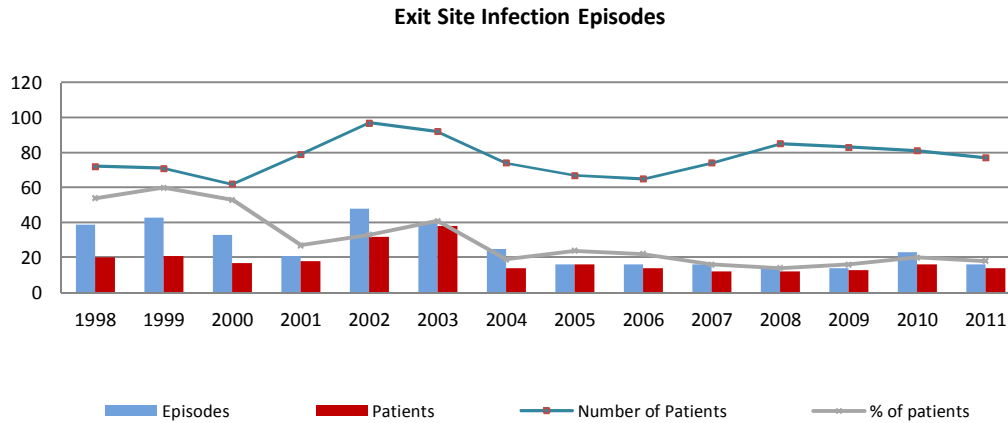


Figure 34: Exit site infection rates



**Figure 35: Episodes of exit site infection per year**

ANZDATA does not collect data on Exit Site Infections; therefore there is no Australian benchmark data with which to compare. However, deterioration in exit site infection rates occurred during 2011.

### Technique failure

- Thirteen patients transferred to haemodialysis either temporarily or permanently during 2011, this is a decrease from 2010, St George continues to have a lower percent of patients that change modality for social reasons than ANZDATA.
- ANZDATA 2010 reports the most common primary cause of technique failure (ceasing peritoneal dialysis) as ‘total dialysis/technical failure’ (39%) and ‘infective’ as the second most common cause (27%). Our primary cause of failure in 2011 is ‘total dialysis/technical failure’ (73%) originating from (total technical failure) blocked catheters, membrane failure (Total dialysis failure) and inadequate solute clearance.

**Table 143 Primary reason for technique failure on peritoneal dialysis compared to ANZDATA**

Primary reason for technique failure	St George 2009 n=9	St George 2010 n=21	St George 2011 n=11	ANZDATA 2010
<b>Infective</b>	44%	24%	18 %	27%
<b>Total Dialysis/Technical Failure (inadequate dialysis, leaks, surgery, mechanical)</b>	44%	62%	73%	39%
<b>Social (patient choice, failed training)</b>	11%	14%	9%	34%

## Summary

1. Iron management continues to be a challenging area to manage in PD patients due to the reliance on patients having to make supplementary visits to the hospital for iron infusions to ambulatory care .Nurse initiated iron commenced in 2008 and requires the staff to contact patients and organise admissions to ambulatory care. Results in October 2011 did seem to suggest some improvement.
2. The higher rate of APD in the St George dialysis unit may be an influential factor in maintaining infection rates below that of ANZDATA. The negative impact of this is patients are unable to do CAPD and therefore need admission if they have a peritonitis infection.
3. The percent of patients transferring to haemodialysis through technical failure (leaks, surgery and mechanical) decreased in 2011. These transfers can be accounted for a blocked catheter, membrane failure and inadequate solute clearance problems. This is similar to previous reports.
4. The rate of failing PD due to social reasons continues to be lower than the rate reported by ANZDATA. This may indicate that our patients are more suitable for the PD either financially or socially and are therefore more able to manage with their chronic disease. Technical failures are much higher and this needs to be evaluated more closely. It may be related to the initiation of a PDC under local anaesthetic.
5. Phosphate control and higher calcium phosphate products remains a continuing issue for patients again in 2011. The PD unit is planning to promote patient education on the importance of taking phosphate binding medication correctly and the aim is to utilise educational pamphlets and patient education programs more actively.
6. The increasing age of peritoneal dialysis patients may be adding to the complexity of training, and especially with an automated peritoneal dialysis machine. This, along with the need to educate patients from non-English speaking backgrounds is an ongoing challenge in the PD unit. Training is individualized to patients and carers needs. Education and re-training is provided on an ongoing basis where the need was identified during our home visits and patients' clinic visits.
7. Overall the markedly significant reduction in the peritonitis rate to 1 per 47.9 patient months is seen as a fantastic achievement for the PD unit

## Anaemia Report

Written by Coralie Meek

The part-time role of Anaemia Co-ordinator came to a close in December 2011, having completed a 2 year program for improving the management of anaemia and iron supplementation for the St George Hospital Renal Department. It provided an ongoing support role to nurses working in the Incentre, Satellite, PD and Home training areas, and provided in-services to staff on the complexities of anaemia management and iron supplementation. It is now hoped that the foundations laid down over the past 2 years will still make a difference in years to come.

A comprehensive database maintained over the 2 year period allowed the Anaemia Co-ordinator to monitor a large percentage of patient blood results on a monthly basis. Support to the Nephrologists was provided on a weekly basis to help identify those patients falling outside the preferred ranges for anaemia and iron markers, and provided a reliable link back to the primary nursing teams regarding the management of such patients.

The role was also responsible for the upgrading of the Renal Department's protocols for Anaemia Management and Iron Supplementation in line with best practice principles and devising a Fast Track Iron Protocol for use in the Ambulatory Care Unit. Regular audits were attended regarding the compliance of primary nurses with the upgraded protocols, showing an average of 97% compliance for ESA administration and iron dosing across all units. To conclude, there was also an opportunity to present the outcomes of the role to an audience at the Quality and Research Forum held at Sutherland Hospital in April 2011.

### **Outcomes for 2011:**

#### **Modalities include Incentre, Satellite, Home and Peritoneal Dialysis:**

##### **Percentage of patients in Hb range 100 to 120 g/L across all modalities:**

53% January to June 2010

58% July to December 2010

**58% January to December 2011**

(Incentre 62%, Satellite 56%, Home 51%, PD 54%)

48% Amgen target of 10 to 12 g/L as reported by USRDS (2009)

##### **Percentage of patients with Ferritin in range 200 – 800 mg/ml across all modalities:**

76% October 2010 Annual Report

**73% October 2011 Annual Report**

59% ANZDATA

##### **Percentage of patients with Tsats in range 20 – 50% across all modalities:**

69% October 2010 Annual Report

**74% October 2011 Annual Report**

56% ANZDATA

##### **Percentage of patients across all modalities with both Ferritin and Tsats in range:**

63% 2009 Annual Report

89% 2010 Annual Report

**60% 2011 Annual Report**

### **Summary:**

The St Hospital Renal Department has maintained its percentage of patients in the target Hb range of 100 to 120 g/L steady at 58%. There has also been an improvement in patients having Tsats in range from 69% to 74% from 2010 to 2011. Overall, the figures are comparable to previous annual reports and the benchmarks set down by ANZDATA.

## Transplant

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

### Overview

As of 31/12/11 there were **155 patients under the care of SGH nephrologists who had previously had renal transplants.**

- 147 of these have a primary graft and 8 have a second graft.
- 9 patients were transplanted pre-emptively.
- 14 patients received kidney transplants during 2011 and one patient received a kidney pancreas transplant.
- 6 patients died during the year: 4 with a functioning graft, the other 2 suffering graft failure and nephrectomy due to sepsis prior to death.

At 31/12/11 there were **60 patients listed on the NOMS waiting list, making up 50% of the East Coast Renal Transplantation Service (ECRTS) list** comprising patients from SGH, Prince of Wales (POW) and The Wollongong Hospital (TWH).

The transplant assessment clinic started in January 2011 where all patients listed are seen by a physician from the transplanting unit (Prince of Wales hospital).

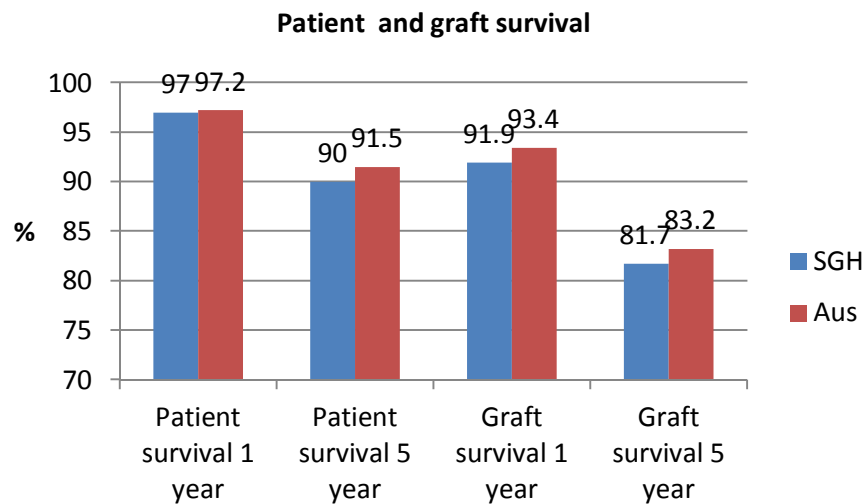
- At this clinic 47 listed patients and 43 new patients were reviewed.
- 24 new patients were approved as suitable for listing and subsequently activated on the NOMS waiting list.
- Of the remaining 19 new patients:
  - 8 patients were pre-emptive;
  - 9 were not suitable pending further screening
  - 2 were told that they were unsuitable for transplant

### Transplant patient flow

	<b>01/01/2011 SGH transplant patients registered with ANZDATA</b>		<b>150</b>
Out	Transferred care out	3	
	Died	6	
	Graft failure returned to dialysis	1	
	<b>Subtotal out</b>		<b>10</b>
In	Transplanted	15	
	Transferred care in	0	
	<b>Subtotal in</b>		<b>15</b>
	<b>Net gain</b>		<b>+5</b>
	<b>31/12/11 SGH transplant patients</b>		<b>155</b>

## Patient and graft survival

**KPI: 1, 5 and 10 year patient and graft survival at or better than national benchmark**



**Patient deaths N=8 (5 years 2004-2009):**

- 4 cardiac, 1 vascular, 3 infection

**Graft failure N=16 (5 years 2004-2009):**

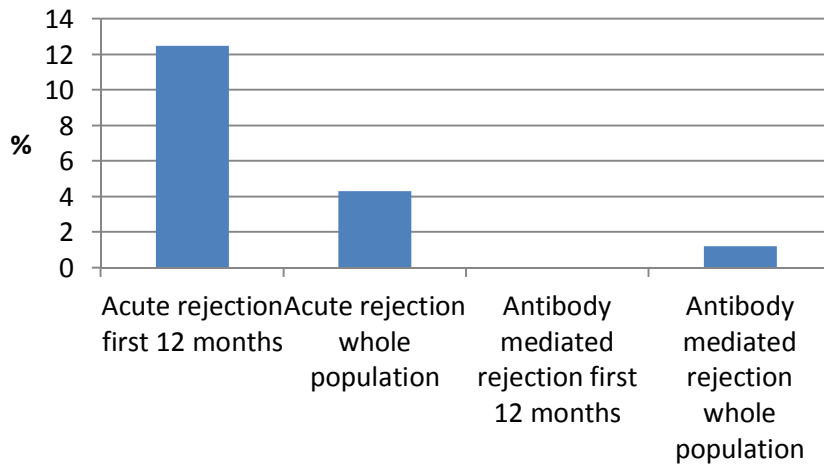
- 2 acute rejection,
- 7 chronic allograft nephropathy (CAN),
- 2 vascular/technical,
- 5 death with functioning graft

(Figures based on ANZDATA report 2004-2009 Transplantation SGH as caring hospital.)

## Episodes of rejection

**KPI: Episodes of biopsy proven acute rejection within the first 12 months <30%**

**Acute and antibody mediated rejection %**

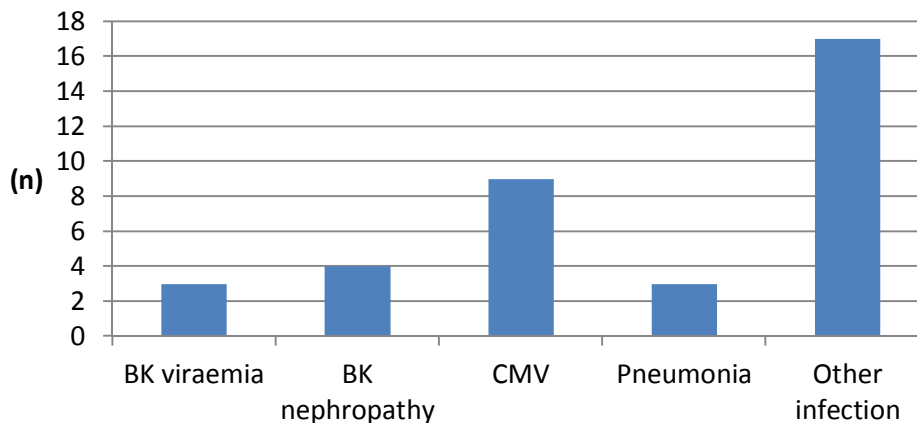


**Infection**

In 2011,

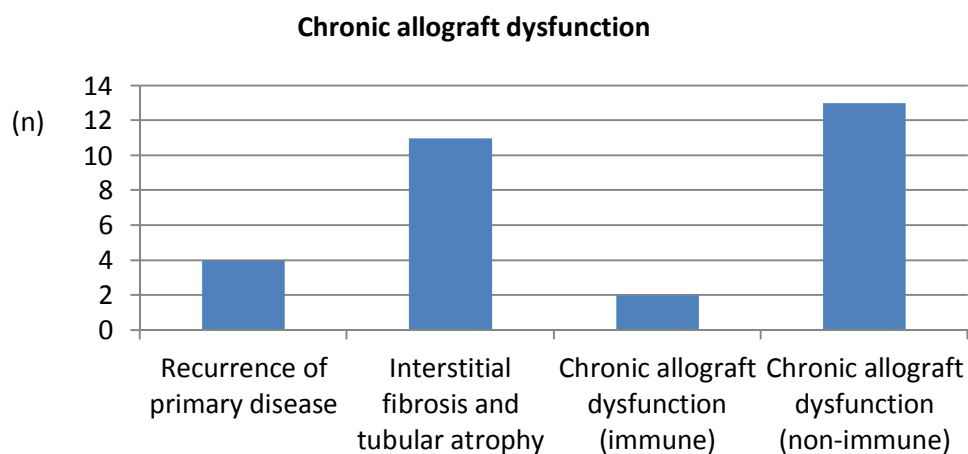
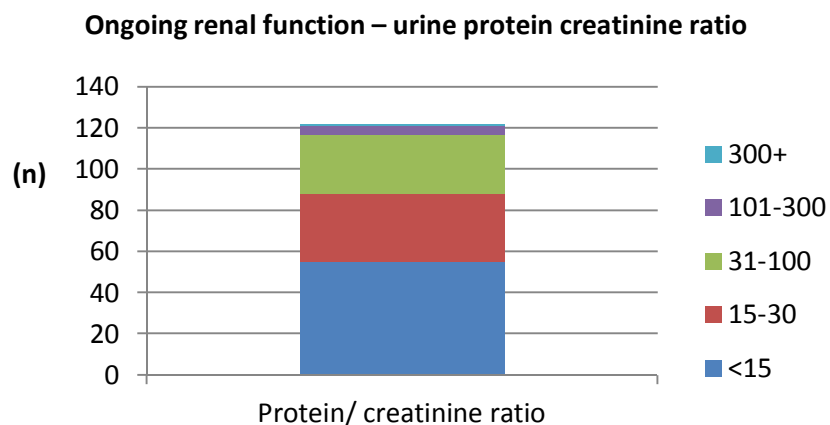
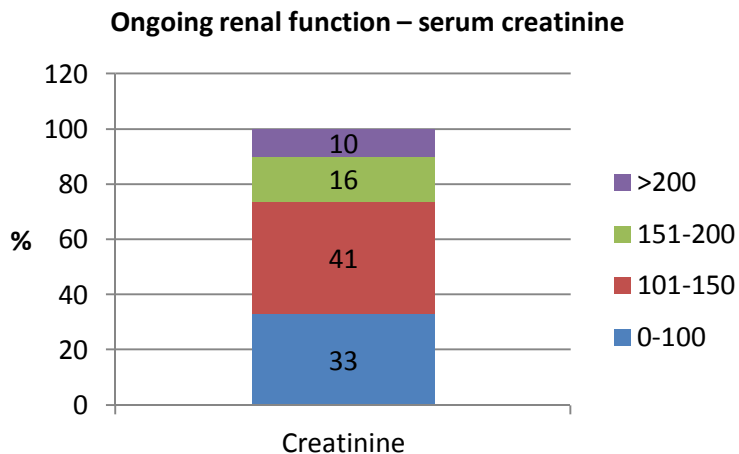
1. 9 patients out of 52 tested (17%) have tested positive to cytomegalovirus (CMV) nucleic acid or CMV DNA.
2. 5 patients out of 69 tested (7%) have had a BK PCR positive result and 3 patients (2%) have had BK nephropathy proven on biopsy.
3. 17 of the 165 (10%) had other infections including:
  - a. shingles,
  - b. wound infections,
  - c. upper respiratory,
  - d. urinary tract
  - e. genital herpes.

**Infection**



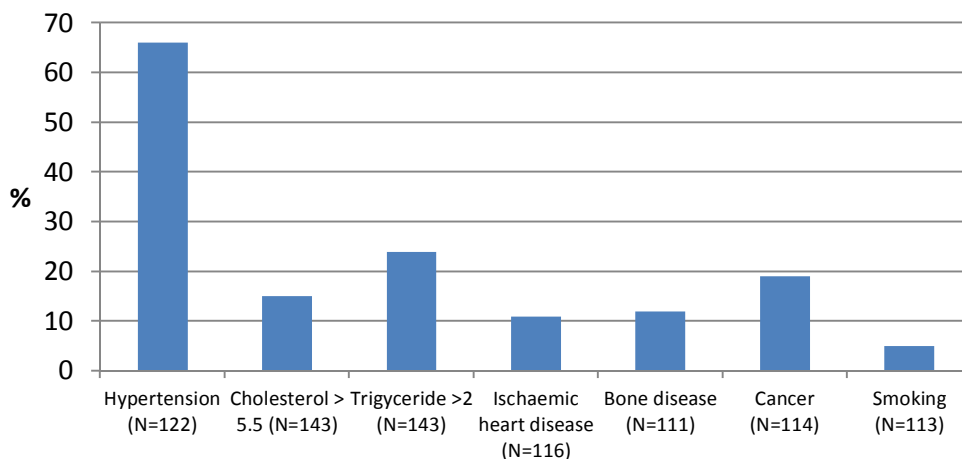


## Ongoing renal function

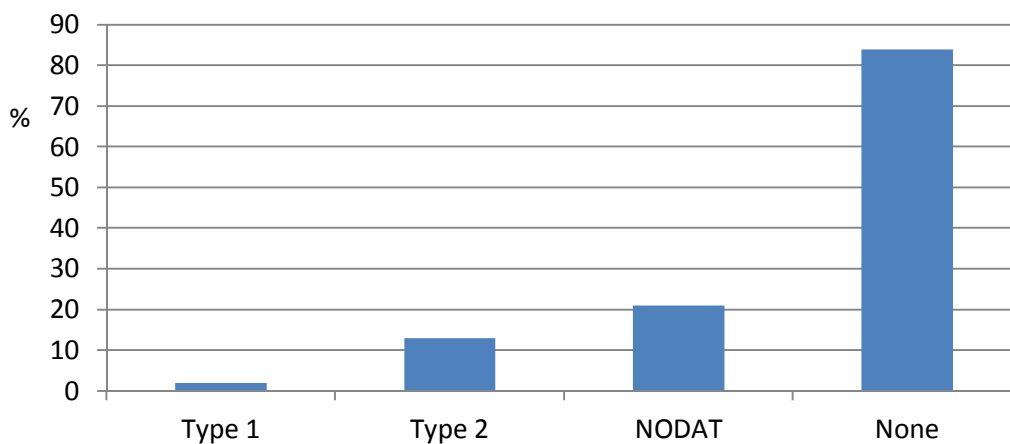


*Long term follow up (N=165)*

**Co-morbidities**

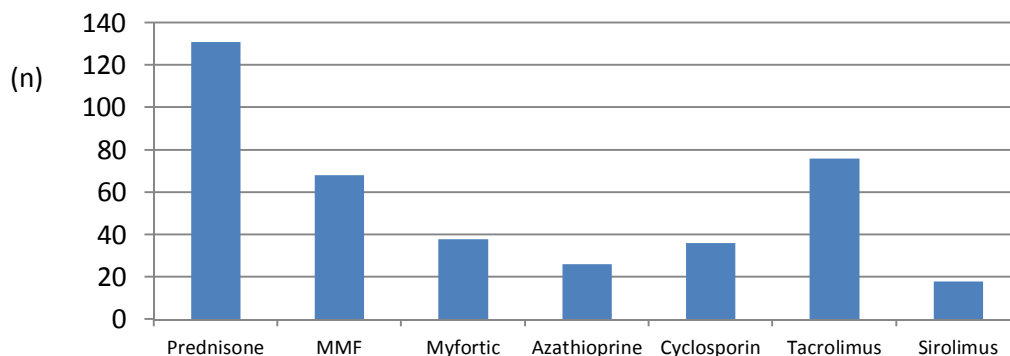


**Diabetes**

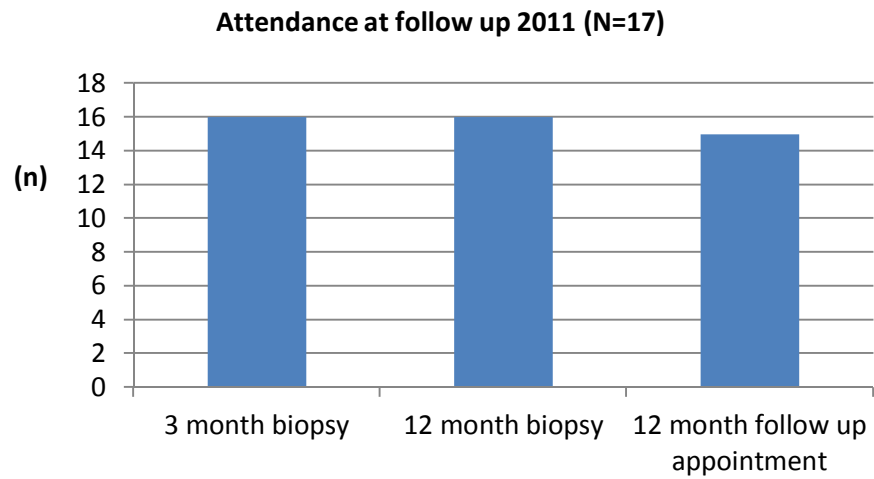


NODAT: New onset diabetes after transplant

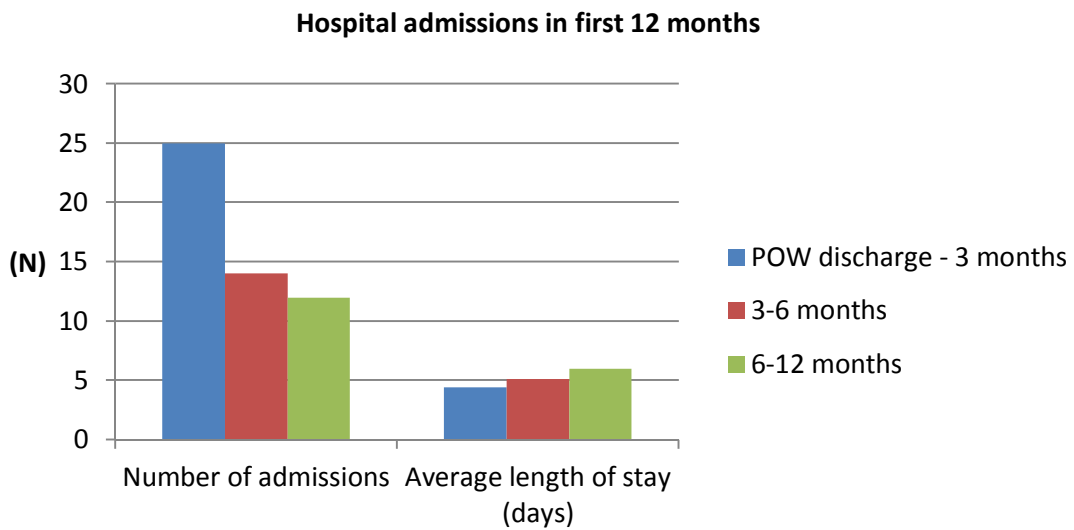
**Drug therapy**



*Follow up in the first 12 months*

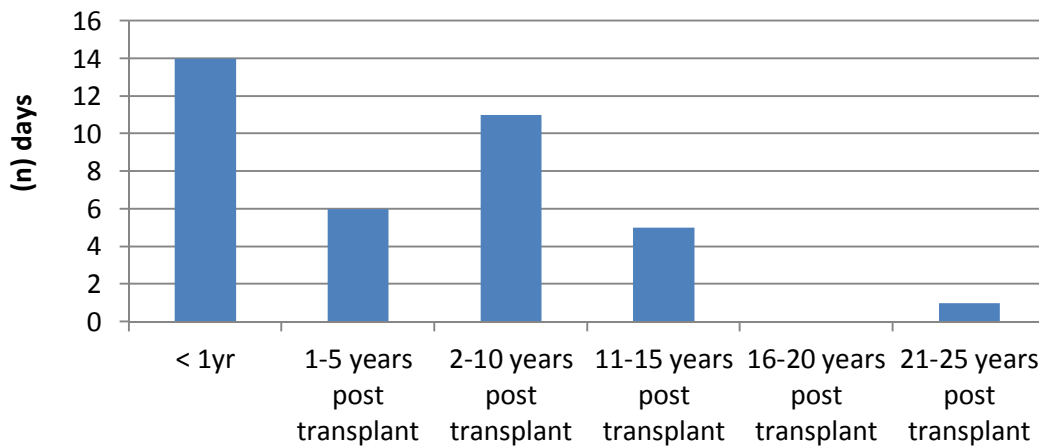


*Hospital admissions*



These figures are based on the 17 patients transplanted in 2010 completing their first year post-transplant in 2011.

**Average length of stay for all transplant patients July – Dec 2011**



These figures are based on all hospital admissions for 165 SGH transplant patients in the last 6 months of 2011. Total days all patients were in hospital = 413; average length of stay = 8 days

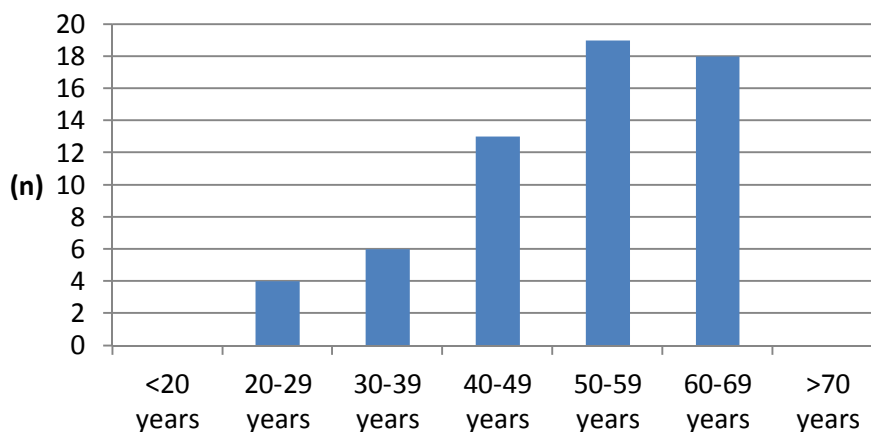
**Waiting list data**

At 31/12/11 60 St George patients were listed on the National Organs Matching Service (NOMS) waiting list.

They were aged from 27 – 69 years and have been on dialysis <1 month – 12 years.

56 were waiting for their 1<sup>st</sup> graft and 4 waiting for their 2<sup>nd</sup>.

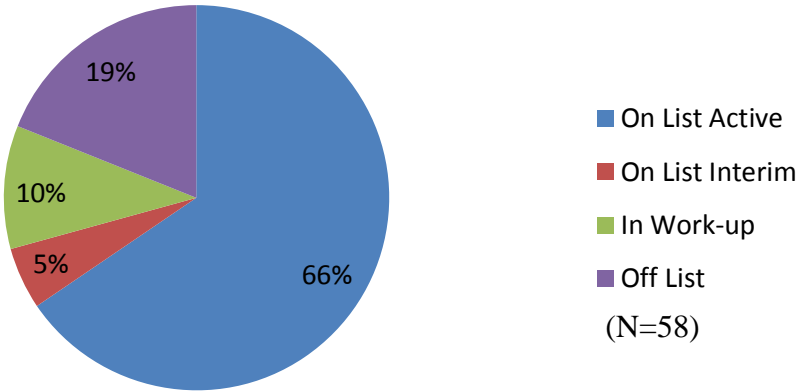
**Age of SGH patients listed with NOMS 31/12/11**



The age group with the largest number of patient waiting is the 50-59 year olds. More detailed investigation has been carried out into how many of the patients aged 25-55 years old and on renal replacement therapy are listed for transplant.

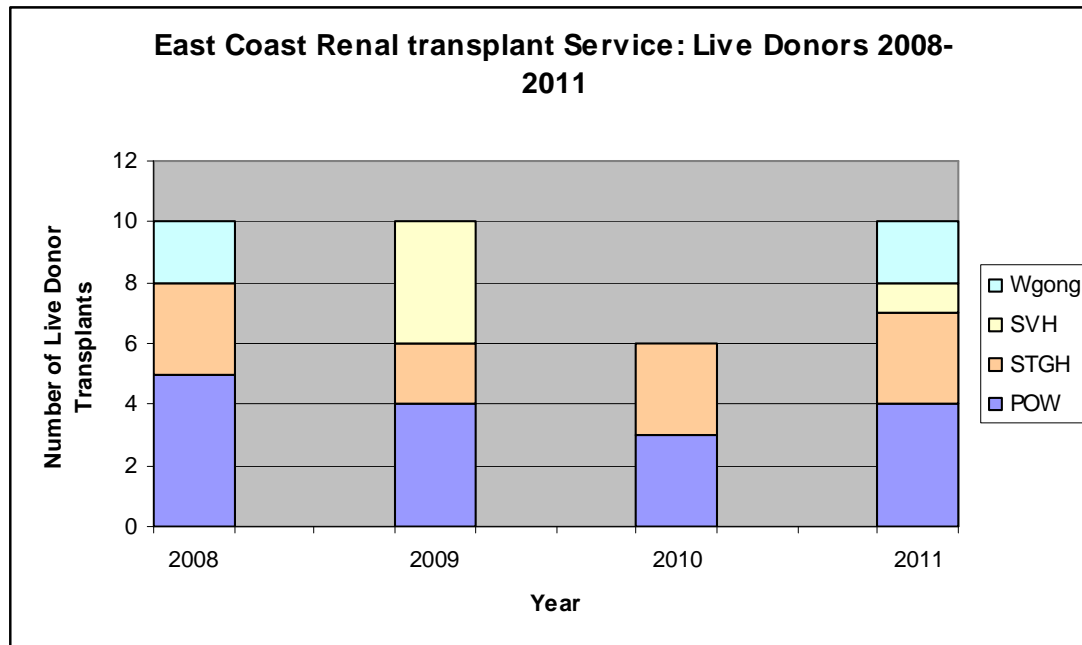
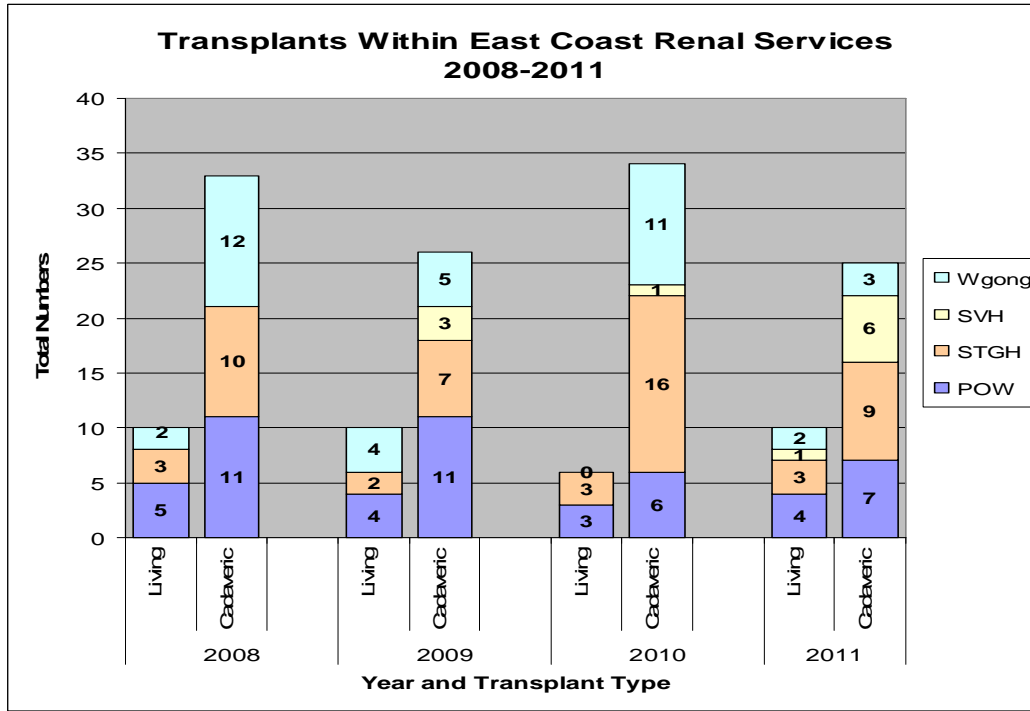
- 81% of SGH patients in this group are listed or in work-up;
- the remaining 19% have specific medical or psychological reasons why they are not suitable for transplant.

**St George patients 25-55yrs on RRT pre-transplant status Dec 2011**



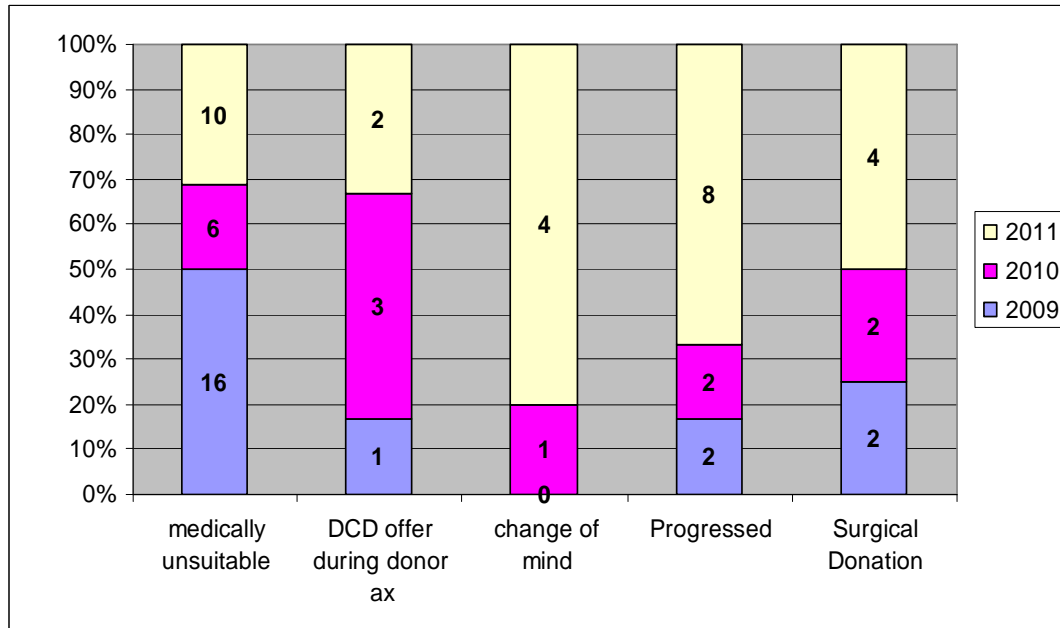
# Renal Donor Clinic Report 2011

Cumulative STG and ECRS Donor Data 2008-2011



**2009-2011:**

- 32 of 65 patients have been found to be medically unsuitable to progress as renal donors 49%
- 5 of 65 (8%) donors had a change of mind.
- In addition; 6 donor (9%) assessments were suspended when recipient received DCD transplant
- 12 (18%) donors have been cleared as suitable from STG and 8 (12%) have progressed to surgery to date.



**In 2011.**

- Donor Age Range: 24- 70 years of age
- Average Age : 45 years
- Relationship to Recipient
  - 34% spouse (unrelated)
  - 26% mother
  - 17% sister
  - 9% brother
  - 6% father
  - 6% son
  - 3% daughter
- Gender of Donors : 46% male

### Reasons for Donor Non-Progression

	2009	2010	2011
Renal Disease or Low GFR	2	2	2
Immunological	3		-
Recipient issue	1	1	-
Diabetes/IGT	2	1	2
Change of Mind	2	2	2
Paraprotein	1		1
HT + other	2		-
Social	1		-
Stone Disease	1	1	-
Lost to F/Up	1		1

### Since Circa 2005: 40 patients for donor follow-up (Anzdata report 20)

Public Follow-Up	31 (includes at least 3 lost to follow-up)
Private Follow-Up	12
Officially Transferred Care	3
Lost to follow-Up	finalising data (5+)
Complications	2 perioperative- long term f/up under review

### Time For Assessment (2011). Median (range)

	progression to donation	Non-progression
median time between first contact with donor coordinator and first clinic presentation (days)	15 (0-89)	19 (0-202)
median time between first clinic review and ultimate decision (days)	91 (28-378)	19 (0-1548)



## Pre-dialysis Clinic

### Aim

To provide data concerning pre-dialysis clinic attendances and outcomes compared to previous years. The report also provides the reader with information regarding the way the clinic is conducted.

### Overview

As of December 31<sup>st</sup>, 2011 there were 157 patients on our pre-dialysis clinic books with an active plan for renal replacement therapy.

The pre-dialysis clinic has been operating since April 2002. It is coordinated by Renal CNCs and attended by Maria Chan (dietician), Anastasia Anastasiou (Renal Social Worker) and the renal pharmacist. All new patients are provided with dialysis options education, a social work and nutritional assessment, and pharmacy education. A comprehensive letter and assessment of each patient is then sent to the nephrologist. Patients return to the clinic for a follow up at 4-6 weeks and then yearly or as required.

Since the clinics inception in 2002 531 patients have attended. Their progress and outcomes have been tracked through the clinic.

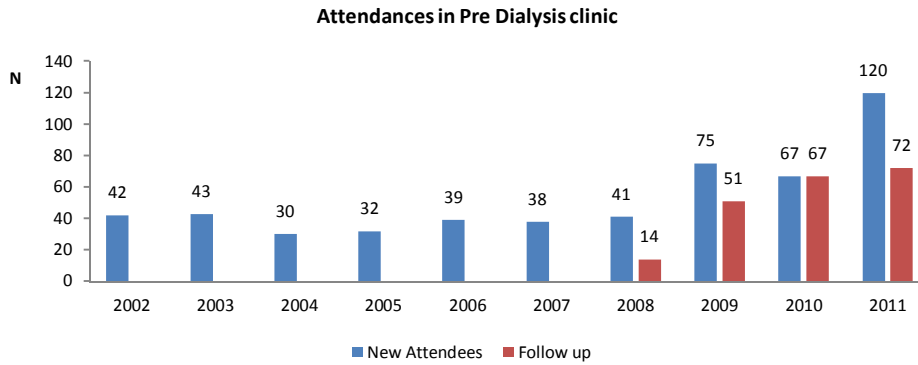
### Clinic activity

The pre-dialysis was busy in 2011 with 120 new attendees and 72 follow up appointments compared to 2010 with 67 new attendees and 67 follow up appointments.

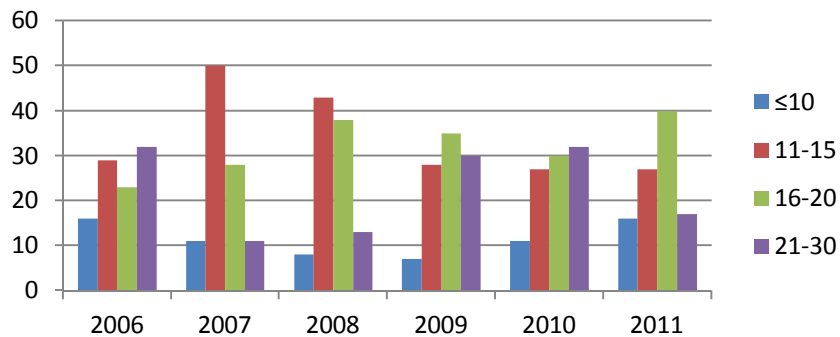
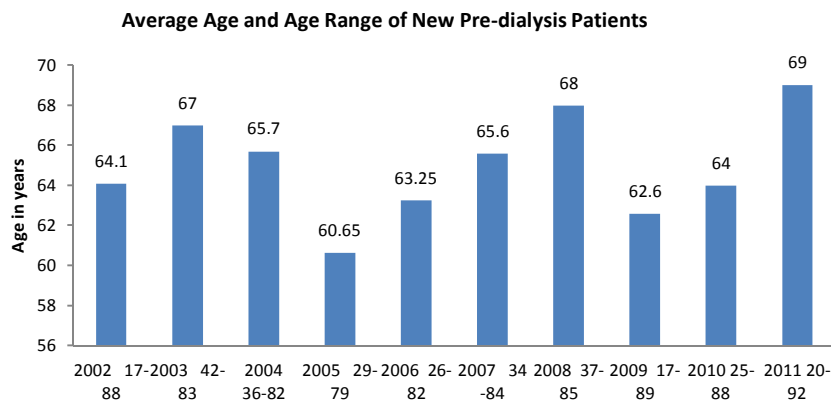
49 people were seen upon request as inpatients in 2011.

Pre-dialysis group education sessions were conducted on two occasions in 2011, one at the local RSL for a block of new patients, and one in a tutorial room for a number of people who were non-English speaking (all new referrals who spoke the same language) using an interpreter.

Clinic letters are stored electronically for easy access by renal staff should the patient present to the emergency department and potentially require urgent dialysis so that their choice of dialysis treatment modality is then known. ***This is an attempt to prevent those patients who indicated that they wish to start peritoneal dialysis commencing haemodialysis acutely and therefore potentially remaining on a non home based dialysis therapy.***



Yearly new attendees and follow up since inception in 2002



eGFR for new patients on referral for pre dialysis education

The guideline for referral to the Pre dialysis Clinic is

- Creatinine >300, and/or
- eGFR < 25.

**The benchmark for referral is 50% eGFR > 20, 70% eGFR > 15.**

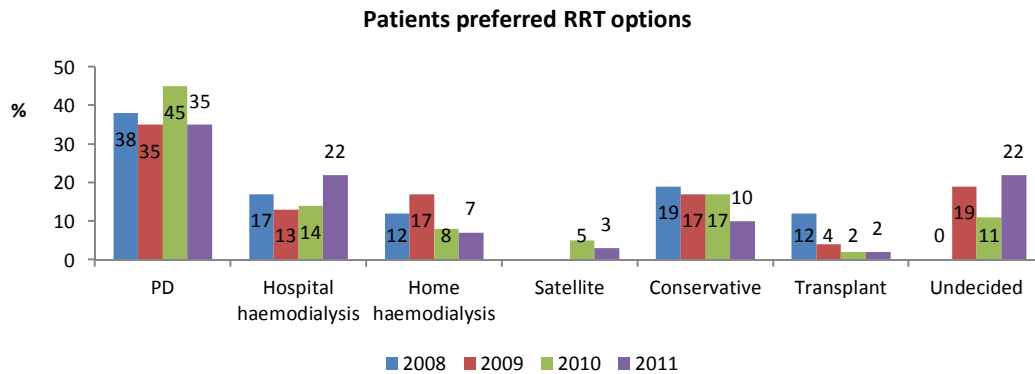
In 2011 at St George Renal Unit:

- 17% had an eGFR >20 and 57 % had an eGFR > 15 on referral for pre dialysis education.

Once a patient is referred to the pre-dialysis clinic the following processes occur:

- Patients are tracked on a database which is updated as new information e.g. doctors letters or blood results are available.

- The clinic database is stored on a hospital renal network file (RISCdoc) allowing access by all renal staff.
- Patients are flagged at a serum creatinine of >400 and/or eGFR <15.
- The Vascular Access Nurses are alerted to check for or initiate a vascular referral in patients on the haemodialysis pathway.
- The peritoneal dialysis staff are alerted when patients requesting a peritoneal dialysis pathway require a comprehensive pre catheter insertion assessment.



#### Percent of patients who opt for specific RRT therapies as a result of pre-dialysis education

- 44 of the 47 ESKD patients who commenced haemodialysis in 2011 had attended the clinic pre dialysis.
- 18 out of 21 new peritoneal dialysis patients had attended the pre dialysis clinic for education and assessment.
- Of the 47 new dialysis patients, worryingly 14 were seen as inpatients for pre dialysis education, 8 of whom were seen less than 3 months before dialysis commenced with 3/8 being late referrals to a nephrologist.
- Minimum time seen before dialysis was nil (dialysis had already commenced), maximum was 72 months with a mean of 13 months.
  - For the patients seen via inpatient referral the mean time seen before dialysis commencement was 4 months (median 1.5 months) compared to 16 months (median 7.5 months) for those referred via the pre dialysis clinic.
  - **Only 60% of all new dialysis patients had pre-dialysis education  $\geq$  3 months before dialysis commencement.**
- **Overall this data reflects an ongoing problem with late referrals for education.**

#### Patient Satisfaction

Patients scored the Pre-dialysis service with a median satisfaction rating of 22 out of maximum score of 24. This included evaluation for timely appointment, helpful staff, waiting time, comprehensive assessment, left with a good understanding and a personal rate of satisfaction.

## Benchmarking

Benchmarking with other major pre-dialysis services (NSW) was due to commence in 2011 but has not done so at this point. The following benchmarks have been chosen.

1. At the commencement of RRT 80% of patients have had a review in the pre-dialysis assessment and education program greater than 3 months previously and within 12 months.
2. Hepatitis B vaccination – by commencement of RRT 50% of patients attending the pre-dialysis clinic have completed a course of hepatitis B vaccinations.
3. 70% of patients who are known to the unit and have attended pre-dialysis assessment and education program commence their planned dialysis choice.
4. Timely referral to Predialysis Program
  - 50% eGFR > 20
  - 70% eGFR > 15

### **Patients who commenced their treatment of choice at commencement of RRT**

The benchmark is 70% of patients commencing their treatment of choice.

Of the patients who chose a specific dialysis modality, these are the percent of patients who commenced RRT with their treatment of choice (excluding those still on the pathway and those who are undecided on their treatment choice):

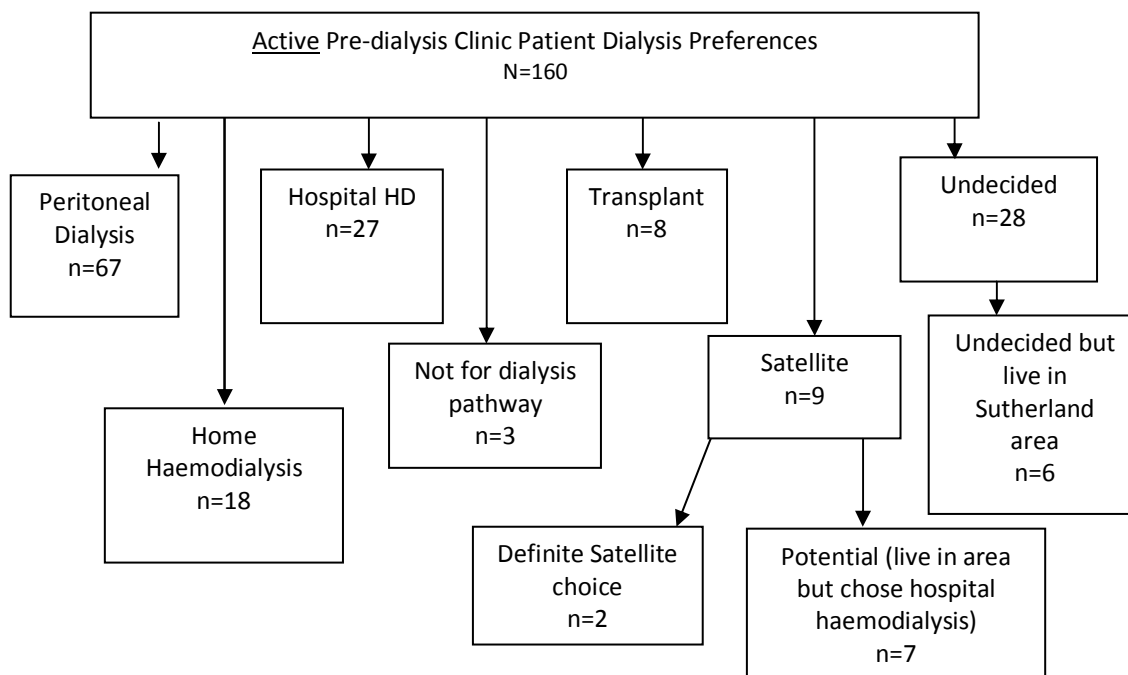
- Peritoneal dialysis 73%
- Home haemodialysis 63%
- Hospital haemodialysis 81%
- Pre-emptive Transplant 46%.

Home haemodialysis targets were not reached due to changes in health and personal circumstances over time.

Transplantation targets were not met due to complexities in the work up for the transplant process.

- Both home haemodialysis and renal transplantation require early and comprehensive planning before being able to enter this modality.
- Of those who chose home haemodialysis, 19% commenced on hospital haemodialysis, 7% were lost to follow-up.
- Of those who chose peritoneal dialysis, 17% commenced on hospital haemodialysis and 5% died before reaching dialysis.

### Pathways of active Pre-Dialysis patients



### **Summary of Benchmarking**

1. Only 60% of new dialysis patients (excludes acute dialysis) had pre-dialysis education  $\geq 3$  months before dialysis commencement which does not meet the 80% benchmark.
2. Processes for ensuring pre-dialysis patients receive appropriate Hepatitis B vaccinations pre dialysis, and measuring compliance is being developed.
3. Benchmarks for patients commencing treatment on their chosen pathway are being met for peritoneal and hospital haemodialysis.
4. The key message remains that there is room for improvement in early referral. Patients should be referred for pre dialysis education in a timelier manner.

# Hypertension Unit report

Written By Jennifer Beddoe

## 24 hr Ambulatory BP Monitoring

For 2011 this unit attended to 386 ABPMs. Letters were sent to patients who do not attend their ABPM appointments and their referring Dr receives a copy of this.

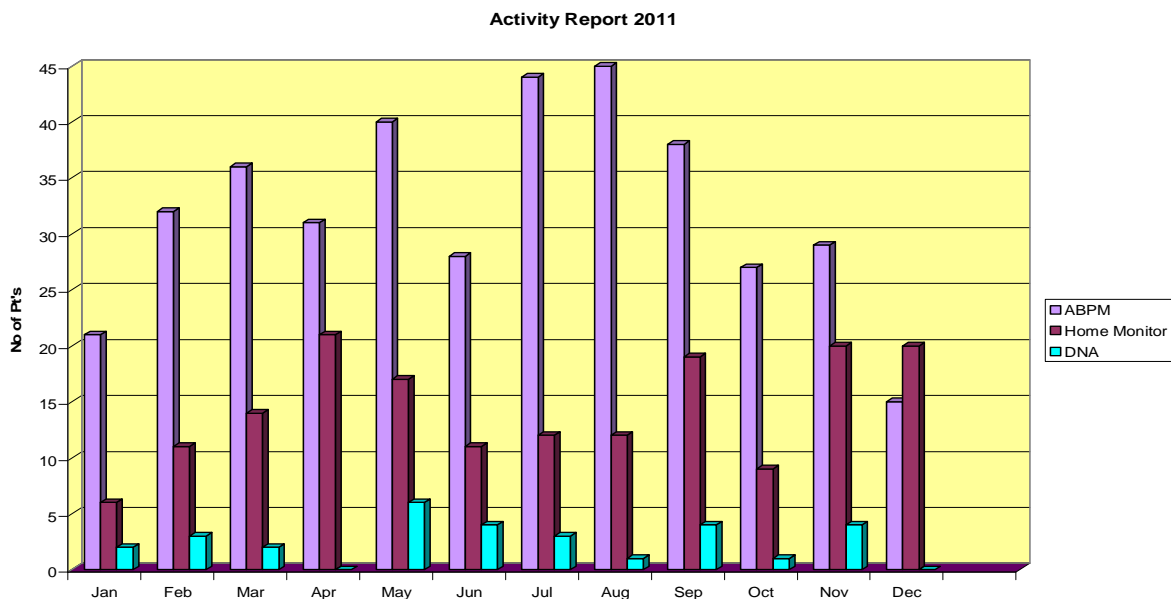
## Home BP devices validation

Another important service is that of validating home blood pressure measuring machines for accuracy; 172 home monitor checks have been attended this year. Patients are encouraged to have their home monitors checked on a yearly basis and letters are sent out to remind them of this.

All results from both the ABPMs and home monitor checks are entered into a database.

## Plans for 2012

2012 will see the introduction of the BP Tru & Sphygmocor assessments. These will be carried out in conjunction with their ABPM, initially still in a research capacity.



## Renal Supportive Care Clinic

Written by Elizabeth Josland

### Aim

The aim of this report is to provide data to the department highlighting clinic attendances and outcomes.

### Overview

The renal department has been working closely from 2009 to 2011 with Dr Frank Brennan and Dr Jan Maree Davis from the Palliative Care Service to integrate a palliative care chronic disease model of care to benefit our end stage renal disease patients.

Dr Jan Maree Davis, Dr Frank Brennan, Elizabeth Josland, Shelley Tranter, Anastasia Anastasiou, Maria Chan, Gemma Collett, Celine Foote and Mark Brown comprise the renal palliative care groups and meet monthly to discuss and implement renal supportive care initiatives.

The **Renal Supportive Care Clinic (RSC)** commenced in March 2009, it increased from bi weekly clinics to weekly clinics in December 2010. It is staffed by Dr Frank Brennan, a renal registrar, renal supportive care clinical nurse consultant and a research assistant. The clinic also receives support from the renal social worker and dietician.

The second **Renal Supportive Care Symposium** was held on 19<sup>th</sup> August 2011. Doctors, nurses and allied health again were invited for the event which included workshops and presentations. There were over 190 attendees in 2010 and 150 attendees in 2011 from around Australia and New Zealand.

The renal department website has a dedicated palliative care section which includes details of current research, guidelines, patient information, education and presentations.

### Clinic Attendances and Outcomes

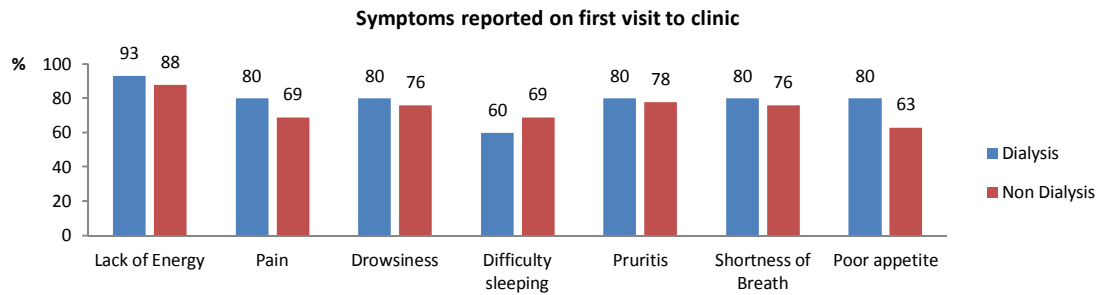
There were:

- 110 visits to the clinic from March 09 to Dec 09,
- 218 visits in 2010
- 403 visits in 2011.

Since the commencement of the clinic, the age of patients range from 24-95 years with the average age being 77 years.

Males account for 63% of patients to the clinic.

Symptoms reported on the first visit for both dialysis patients and conservatively managed (non dialysis) patients attending clinic show a high symptom burden.



**Symptoms reported on the first visit to the supportive care clinic using MSAS survey**

There are 3 main categories of patients who use the services of the renal supportive care clinic;

1. conservative care support,
2. dialysis (or pre dialysis) symptom support
3. support for those who may be withdrawing from dialysis following a major sentinel event or by choice.

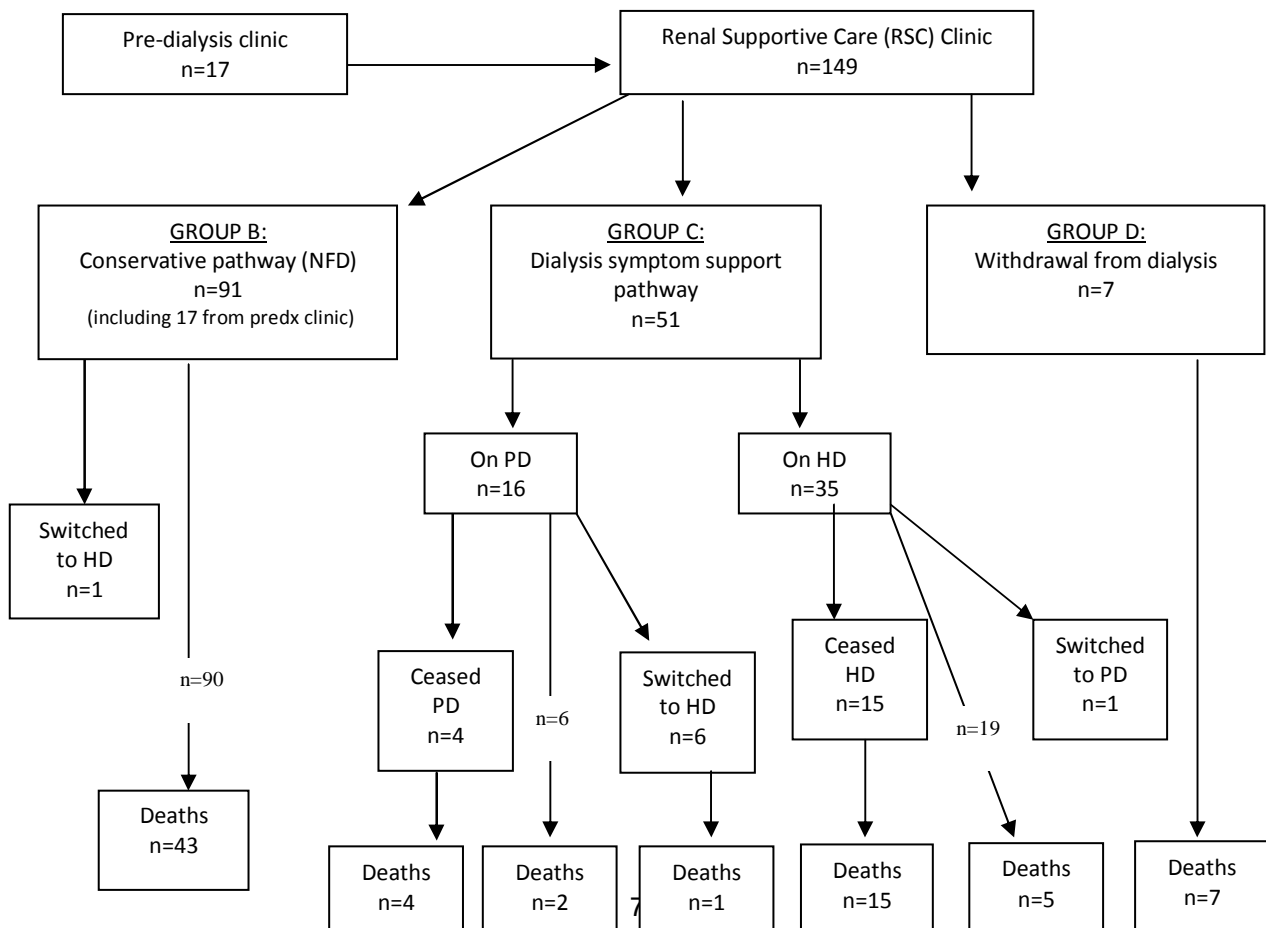
Below is a flow chart which shows patient outcomes up to December 2011.

**Pathways of patients who attended Renal Supportive Care clinics (March 2009 – December 2011)**

GROUP B: RSC clinic- conservative pathway

GROUP C: RSC clinic- symptom support on dialysis

GROUP D: RSC clinic- withdrawal from dialysis





## **Summary**

The RSC clinic offers holistic service to end stage renal failure patients and their families to reduce symptom burden, improve quality of life and provide end of life care where required. RSC works in collaboration with the palliative care service.

Measurements of symptom burden, quality of life and patient satisfaction are collected routinely with ethics approval to monitor clinic outcomes over time. This will be reported in future analyses.

The RSC clinic is being well utilized by the renal patients, as can be seen by data above. This implies patient and family satisfaction, an issue that will be tested more formally as part of our research in this program.

## Workplace satisfactory Survey Outcome

### October-November 2011

As part of EOC programme, survey was undertaken during October-November 2011

Number received: 17 of 38. Response rate 44%

#### Workplace Satisfaction Questionnaire

<i>How much you enjoy your job</i>	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree / Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
My job gives me a lot of satisfaction- <b>65% agree-strongly agree</b>	12%	53%	29%	6%	0
My job is very meaningful for me- <b>88% agree-strongly agree</b>	53%	35%	6%	6%	0
I am enthusiastic about my present work- <b>82% agree-strongly</b>	23%	59%	11%	6%	0
My work gives me an opportunity to show what I'm worth- <b>82% agree-strongly agree</b>	23%	59%	11%	6%	0
In the last year, my work has grown more interesting- <b>59% agree/strongly agree</b>	35%	23%	35%	6%	0
My work is monotonous- <b>29% Agree 47% partly agree</b>	0	29%	47%	11%	11%
It's worthwhile to make an effort in my job- <b>88% agree/strongly agree</b>	18%	70%	6%	6%	0
My skills are fully utilised in my work- <b>82% agree/ strongly agree</b>	29%	53%	11%	6%	0
I often think about quitting my job- <b>65% disagree/ strongly disagree</b>	6%	0	29%	35%	29%

<i>Doing your job</i>	<i>Strongly Agree</i>	<i>Agree</i>	<i>Partly Agree / Disagree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
I have enough time to deliver good care to patients - <b>76% partly agree/ partly disagree</b>	0	18%	78%	6%	0
I have enough opportunity to discuss patient problems with colleagues- <b>46% strongly agree/agree</b>	11%	35%	54%	0	0
I have the knowledge and skills to do the job- <b>95% agree/ strongly agree</b>	11%	84%	6%	0	0
I feel able to learn on the job- <b>95% agree/strongly agree</b>	29%	66%	6%	0	0
I feel isolated from my colleagues at work- <b>88% disagree/strongly disagree</b>	0	0	11%	59%	29%
I feel confident as a clinician- <b>89% agree/strongly agree</b>	11%	78%	0	11%	0
I take an active role in making decisions about patient care- <b>89% agree/strongly agree</b>	18%	71%	11%	0	0
It is not clear what my role is in within the team- <b>100% disagree/strongly disagree</b>	0	0	0	77%	23%
I feel overwhelmed by my job most of the time- <b>46% agree/partly agree, 54% disagree</b>	0	11%	35%	54%	0

<b><i>The multidisciplinary team you work with</i></b>	<b><i>Strongly Agree</i></b>	<b><i>Agree</i></b>	<b><i>Partly Agree / Disagree</i></b>	<b><i>Disagree</i></b>	<b><i>Strongly Disagree</i></b>
I feel I am an active part of the multidisciplinary team- <b>82% agree/strongly agree</b>	11%	71%	11%	6%	0
I do not feel that I belong to a team- <b>70% disagree/strongly disagree</b>	0	11%	23%	35%	35%
I have enough support from colleagues- <b>64% agree/strongly agree</b>	17%	47%	29%	6%	0
I feel able to express my views within the team - <b>64% agree/strongly agree</b>	11%	53%	29%	6%	0
My views are not listened to- <b>80% disagree/strongly disagree</b>	0	6%	23%	53%	17%
There is a climate of trust and respect <b>59% agree, 35% partly agree</b>	0	59%	35%	6%	0
The team has a positive attitude towards their work <b>41% agree, 59% partly agree</b>	0	41%	59%	0	0

<b><i>The Multidisciplinary team you work with</i></b>	<b><i>Strongly Agree</i></b>	<b><i>Agree</i></b>	<b><i>Partly Agree / Disagree</i></b>	<b><i>Disagree</i></b>	<b><i>Strongly Disagree</i></b>
<i>I have a positive attitude towards my work-</i> <b>82% agree/strongly agree</b>	23%	59%	17%	0	0

<b><i>The unit environment</i></b>	<b><i>Strongly Agree</i></b>	<b><i>Agree</i></b>	<b><i>Partly Agree / Disagree</i></b>	<b><i>Disagree</i></b>	<b><i>Strongly Disagree</i></b>
The ward is a safe place to work <b>65% agree/strongly agree, 23% partly agree</b>	6%	59%	23%	6%	0
The ward is a therapeutic environment – <b>59% agree, 35% partly agree</b>	0	59%	35%	0	6%
The environment is comfortable for patients- <b>53% agree, 41% partly agree</b>	0	53%	41%	0	0

<b><i>Your management</i></b>	<b><i>Strongly Agree</i></b>	<b><i>Agree</i></b>	<b><i>Partly Agree / Disagree</i></b>	<b><i>Disagree</i></b>	<b><i>Strongly Disagree</i></b>
I like the way my ward is run- <b>54% agree/strongly agree, 42% partly agree</b>	6%	48%	42%	6	0
Management are supportive of staff- <b>70% agree/strongly agree, 29% partly agree</b>	11%	59%	29%	0	0
Management do not communicate well with staff- <b>64%disagree/strongly disagree</b>	0	6%	29%	53%	11%
Management are approachable to discuss issues- <b>70% agree/strongly agree</b>	17%	53%	29%	0	0

## Renal Biopsies

Renal biopsy data for the year 2011

	Jan-Dec 2011 (all)	Jan-Dec 2011 (transplant only)
Number of biopsies	107	38(35%)
Total complications	11 (10.2%)	5 (13.1%)
Macroscopic haematuria	5(4.6%)	4(%)
Symptomatic perinephric haematoma	5 (4.6%)	1 (10.5%)
Transfusion	1 (0.9%)	0
Embolisation	0	0

Comparison of complication rates from previous years

	2006	2007	2008	2009	2010	2011
Total Number	77	58	67	106	85	107
Complications (n)	3	4	6	8	8	11
Complication rate (%)	4%	7%	9%	7.5%	9.4%	10.2%

Comparison of specific complications expressed as % (n)

Year	2006	2007	2008	2009	2010	2011
N	N=77	N=58	N=67	N=106	N=85	N=107
(Year Total %)	(4%)	(7%)	(9%)	(7.5%)	(9.4%)	(10.2%)
Gross Haematuria, %(n)	1(1)	0	1.5(1)	1(1)	4.7(4)	4.6(5)
Haematoma, %(n)	1(1)	2(1)	0	5.6(6)	4.7 (4)	4.6 (5)
Angioembolisation, %(n)	0	0	0	1.9(2)	0	0
Required blood transfusion	1(1)	0	0	2.8(3)	0	1(1)

Comments:

The complication rates for the previous years have been adjusted as pain alone in the absence of significant hematoma, macroscopic haematuria or hemodynamic instability is not included as a complication. The complications were more common amongst the renal transplant recipients (13.1%) primarily from haematuria in 4 of 38 (10.5%) patients. These episodes were minor and did not require any intervention. Two of these transplant patients had been exposed to aspirin although this had been stopped for a week.

### Renal angiogram

Diagnostic renal angiography has continued through 2011 in the Cardiac Catheter Laboratory performed by A/Prof Mangos. Because of difficulty in securing laboratory time, numbers have been limited to 2 angiograms/month. Because of the results of recent large trials and the publication of guidelines, most of the cases are in younger individuals looking for fibromuscular hyperplasia. Where a percutaneous intervention is required, this is performed under supervision of an Interventional Cardiologist.

The development of Renal Nerve Ablation for the treatment of treatment resistant essential hypertension is an exciting area. The St George Departments of Renal Medicine and Cardiology will introduce this procedure in 2012.

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