
# Renal Department

# Quality Indicators

# Annual Report

# 2007

Yanella Martinez, Nephrology CNC and Vascular Access Nurse

Elizabeth Josland, Nephrology CNC

Dr Shelley Tranter, Nephrology CNC

Maria Chan, Renal Dietitian

Professor Mark Brown,
Director, Department of Renal Medicine, St George & Sutherland Renal Service

## Contents

**AIM**

The primary purpose of these reports and benchmarking has been to allow our Unit to detect problems and institute systems or treatments that improve our patients' outcomes. This is facilitated by presentation and discussion of these data at 6 weekly department meetings. Our broad aims are to:

1. Compare our unit's performance for the management of dialysis patients against the national recommended targets in guidelines (CARI: Caring for Australians with Renal Impairment) for the following parameters:
    a. Ca, $PO_4$, Corrected Ca, Ca PO4 product, Albumin, Mg, Hb, Fe studies, Bicarbonate, Lipids and dialysis adequacy.

2. Compare our unit's performance against the NSW chronic renal disease benchmarks.

3. Compare our unit's dialysis water quality to AAMI standards.

4. Compare vascular access outcomes against the USA National Kidney foundation Kidney Disease Outcomes Quality Initiative (KDOQI) and against ANZDATA results for primary access; report and improve central venous catheter infection and complication rates.

5. Report peritonitis and peritoneal dialysis exit site infection rates and compare these with national data and make appropriate suggestions for new treatments.

6. Report characteristics of patients accepted onto dialysis and compare our dialysis population characteristics with data from the 30th Australia and New Zealand Dialysis and Transplantation Registry (ANZDATA) Report 2007.

7. Provide a comprehensive nutrition report for our dialysis patients and suggest subsequent changes to nutrition management if needed.

8. Report Pre-dialysis clinic activities for those with advanced renal failure planning dialysis or transplantation.

## Executive Summary

1. a) There has been little change in Peritoneal dialysis (PD) biochemical results, but some markers have better results than those published in ANZDATA 2007 such as CaPO4 product and PO4. Patients not on erythropoiesis-stimulating agent (ESA) are maintaining their Hb above 110 g/L. Dialysis adequacy in peritoneal dialysis shows 79% of patients have a Kt/V ≥1.7.

b) Overall Haemodialysis (HD) biochemical results are comparable with the 2007 ANZDATA report. Improvements were seen amongst glucose control and reducing the percentage of patients with Hb >130. Patients continue to dialysis adequately as 90% of HD patients achieve a Kt/V ≥ 1.2 and URR 88%.

2. a) The NSW benchmarks show we are meeting the home haemodialysis target, but at the end of 2007 had not opened the new Sutherland satellite dialysis unit which partly accounts for our high hospital HD numbers. These numbers are expected to change with the movement of patients to satellite in 2008 and increasing PD numbers.

b) The indicators from NSW Health show we are achieving good results compared to ANZDATA in most areas such as late referral, numbers on home dialysis, functioning vascular access, dialysis adequacy, dialysis time and peritoneal dialysis infection rates.

3. The audit shows that our results comply with 2004 AAMI water quality standards.

4. a) A higher incidence of infection to permanent haemodialysis access occurred in early 2007; through subsequent changes to policies the infection rate reduced from 4.97 BSI/100 patient months in February to zero in December 2007 for AVG. Additionally, a reduced infection rate occurred for AV fistulas from 1.32 BSI/100 patient months in February to 0.22 BSI/100 patient months in December.

b) The number of patients commencing haemodialysis with a functioning access was 31%, similar to ANZDATA 2007 report for NSW (32%) but slightly lower than the national data (39%).

In 2007 a clinical nurse specialist was appointed to train patients for home haemodialysis at St George in affiliation with Sydney Dialysis Centre. Two incenter patients were successfully trained and transferred to home haemodialysis. This has since encouraged more in-centre patients to become interested in participating in home haemodialysis training. Twenty five percent of St George haemodialysis patients are dialyzing at home compared to 14% in Australia and 21% in NSW (ANZDATA 2007 report). *St George has the third highest number of home haemodialysis patients in the state*.

5. Rates of peritonitis and exit site infections have improved with the peritonitis rate beating the ANZDATA benchmark in two areas, rate and 3 years peritonitis free. The peritonitis rate is 1/20.9 months compared to 1/20 for ANZDATA, and 36% of patients who have been on PD more than 3 years are peritonitis free compared to 33% for ANZDATA. The exit site infection rate has improved from 1/30.2 months in 2006 to 1/36.5 months in 2007.

6. a) The peritoneal dialysis unit had a net gain of 11 patients over 2007 with a total of 74 patients being treated compared to 65 in 2006. The trend in peritoneal dialysis continues to show an increase in number of patients on Automated peritoneal dialysis (APD) (an increase of 18%), which is considerably higher than the trend reported by ANZDATA (3% increase in APD numbers reported). This reflects our Unit's desire to increase home peritoneal dialysis through a 'user friendly' approach such as APD.

b) Compared to the previous years, in 2007 our Unit accepted slightly older peritoneal dialysis patients with the average age being 67 years, which corresponds to the national average published by ANZDATA. There has been an increase in the 45-74 and >84 year age groups and a decrease in the 74-84 year age group numbers. Patients are heavier and have more co-morbidities than previous years and those reported in ANZDATA.

c) The 4 West haemodialysis unit showed a 6% activity growth compared to 1% growth in 2006. As of 31$^{st}$ December 2007, there were 144 hospital haemodialysis patents and 49 patients undergoing haemodialysis at home. The number of new patients commencing haemodialysis was lower in 2007 than 2006.

d) The average age of patients commencing haemodialysis was 65yr, median age 70yr. The median age increased by 19years compared to 2006 data. The ANZDATA report indicates the average age for all new patients was 61years and the median age was 63years. Sixty two percent of new patients commencing haemodialysis at St George are of age 65yr or older which is sixteen percent higher than the ANZDATA 2007 report. This has prompted a Unit discussion again about criteria for acceptance onto dialysis, re-examination of quality of life outcomes for our dialysis patients and the improving the utility of our non-dialysis pathway which is integrated with our Palliative care department.

7. Dialysis patients of SGH receive regular nutritional assessment by dieticians using criteria as recommended by the CARI and DOQI guidelines. Patients attending the current pre-dialysis assessment clinic presented with parameters indicative of poor nutritional health while hyperphosphatemia and achieving optimal phosphate control continues to be a major challenge to our dialysis patients.

8. The Pre-dialysis clinic is held on a Wednesday morning. The clinic is coordinated by the Renal Clinical Nurse Consultant (CNC), Shelley Tranter and operates on a one on one basis with chronic kidney disease patients and their important others. From January to December 2007, there were 39 new attendees;23 males, 16 females.

**NSW 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.

Comparison of St George Hospital dialysis modality rates with NSW Health benchmarks and the Australian data from ANZDATA.

| | Hospital dialysis (%) | Satellite (%) | Home HD (%) | Peritoneal Dialysis (%) |
|---|---|---|---|---|
| ***NSW Health Benchmark*** | ***20*** | ***30*** | ***20*** | ***30*** |
| ***ANZDATA NSW 2007*** | ***28*** | ***31*** | ***15*** | ***26*** |
| St George 2005 | 59 | 0 | 20 | 22 |
| St George 2006 | 61 | 0 | 20 | 18 |
| St George 2007 | 59 | 0 | 20 | 21 |

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

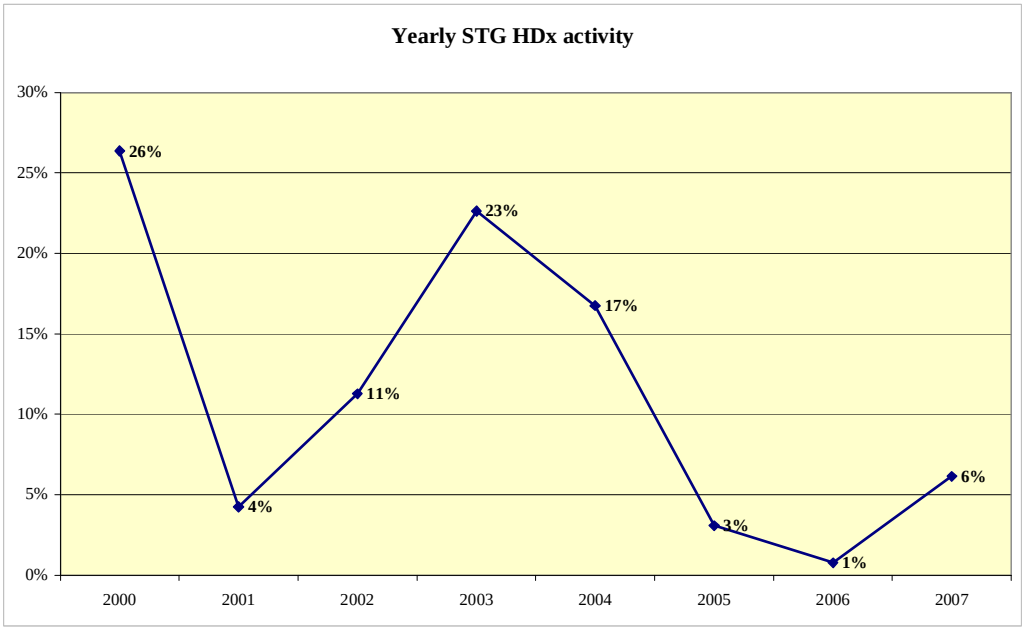
| Principles | Indicators | St George Measurements |
|---|---|---|
| Integrated secondary prevention programs for CKD | 1. Proportion of eligible patients with GFR <30ml/min when first seen by Nephrologist | 1. Not measured |
| Patients with a diagnosis of CKD receive timely, appropriate investigation, 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 21%.<br>Peritoneal Dialysis late referral rate 20%.<br>ANZDATA late referral 23%. |
| 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. 53% (26/49) of new dialysis patients attended the pre-dialysis clinic for education and assessment before treatment commenced in 2007. |
| 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. 31% patients commenced haemodialysis with a functioning AVF, SVG or AVG. ANZDATA 2007 result was 32% (NSW) and 39% (Australia). |

| Principles | Indicators | St George Measurements |
|---|---|---|
| Patients with CKD requiring treatment, have access to clinically appropriate forms of treatment either in home, community or hospital facilities, designed around individual patient needs, including transplantation services where clinically appropriate. | 5. Proportion of patients dialysed at home.<br><br>6. Travel time - Proportion of patients for whom travel time to their dialysis location is ≤ 1 hour. | 5. Total STG dialysis population: Home=41% (20% home haemodialysis & 21% PD)<br>ANZDATA NSW = 41%<br><br>**25% of all STG haemo patients dialyse at home (ANZDATA AUS=14%, NSW=21%)*<br><br>6. 100% |
| Patients with CKD receive high quality, evidence-based, treatment services. | 7. Patient waiting times – Frequency a patient commences dialysis more than 30 minutes after scheduled time.<br><br>8. Proportion of eligible patients who receive adequate haemodialysis (i.e. URR ≥ 65%)<br><br>9. Proportion of eligible haemodialysis patients with total weekly dialysis hours > 15 hours.<br><br>10. Proportion of eligible peritoneal dialysis patients with CCL >50L per week (or Kt/V ≥ 1.8).<br><br>11. Vascular access infection events per 100 patient catheter days.<br><br>12. Number of peritoneal infections per peritoneal dialysis patient-month.<br><br>13. Renal Transplant survival at 1, 3, 5 years | 7. Not measured.<br><br>8. 88% URR ≥ 65%<br>ANZDATA 2007:<br>91% URR ≥ 65%<br><br>9. St George: 50%.<br>ANZDATA 2007: 34% dialyse ≥15 hours per week<br><br>10. 84% had a CCL >50L<br><br>11. CVC infection rate 0.08/100 catheter days.<br><br>12. Incidence per patient months = 20.9 compared to 20 for the whole of Australia (ANZDATA).<br><br>13. This individual hospital data was not available from ANZDATA at time of printing. |
| Patients with CKD at risk of suffering acute renal failure, have access to high quality hospital services in partnership with renal services. | 14. Patient survival in dialysis treatment at 1, 3, 5 years.<br>15. Patient survival after Renal Transplant at 1, 3, 5 years. | 14-15: This individual hospital data was not available at time of printing. |

## HAEMODIALYSIS

### Activity

The total Haemodialysis activity level for 4 West increased 6% from 20,457 dialyses in 2006 to 21,713 in 2007. This growth in activity is greater than the same period last year (1%) but is as expected from National data. The figure below shows the annual % growth in dialyses over the past 7 years.




### Patient Flow:

| | | 2006 | 2007 |
|---|---|---|---|
| **Incentre haemodialysis patients at beginning of year** | | **128** | **141** |
| **IN** | New patients | 39 | 28 |
| | Transfers from other units | 1 | 2 |
| | Temporary transfer from PD | 2 | 4 |
| | Permanent transfers from PD | 15 | 10 |
| | Failed transplants | 3 | 1 |
| | Transfer from Home HDx | 1 | 4 |
| **Subtotal** | | **61** | **49** |
| **Out** | Transplants | 4 | 4 |
| | Transfers to other units | 5 | 2 |
| | Transfers to Home HDx | 6 | 6 |
| | Transfers overseas | 1 | 0 |
| | Transfers to PD | 4 | 12 |
| | Deaths (medical causes) | 15 | 11 |
| | Deaths (withdrawal from dialysis) | 13 | 11 |
| **Subtotal** | | **48** | **46** |
| **Net gain** | | **13** | **3** |
| **Incentre haemodialysis patients at end of year** | | **141** | **144** |

| | | 2006 | 2007 |
|---|---|---|---|
| **Home haemodialysis patients at beginning of year** | | **45** | **51** |
| **IN** | New patients | 7 | 1 |
| | Transfers from PD | 1 | 0 |
| | Transfers from incentre HDx | 6 | 6 |
| | Failed transplant | 0 | 1 |
| **Subtotal** | | **14** | **8** |
| **Out** | Transplanted | 7 | 1 |
| | Transfers to incentre HDx | 1 | 4 |
| | Transfer to other unit | 0 | 1 |
| | Deceased | 0 | 4 |
| **Subtotal** | | **8** | **10** |
| **Net gain/loss** | | **6** | **-2** |
| **Home haemodialysis patients at end of year** | | **51** | **49** |

**Comments:**

- Home haemodialysis training commenced in 2007 at St George hospital. Two incenter patients were successfully trained and transferred to home haemodialysis. This has encouraged more incenter patients to become interested in participating in home haemodialysis training.
- Twenty five percent of haemodialysis patients are dialyzing at home compared to 14% in Australia and 21% in NSW as stated in the ANZDATA 2007 report.
- A similar overall death rate occurred in 2007 (13%) compared with the ANZDATA 2007 report (14%). Deaths due to withdrawal from haemodialysis remains higher for St George (8%) compared to ANZDATA (5%).
- There was an increase in transfers from haemodialysis patients to PD in 2007 and a decrease in transfers from PD to haemodialysis consequent on reduced infection rates.

## ACCEPTANCE ONTO HAEMODIALYSIS

### Background

- The data for this audit consisted of patients who commenced incentre and home haemodialysis in 2007.

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

- Data was collected from ANZDATA forms, dialysis patient files, doctors letters and medical records.
- Data was entered into an Excel database by the Clinical Nurse Consultant.
- Data was collected on:
  - GFR using Cockcroft-Gault formula corrected for BSA
  - Co-morbidities
  - Gender
  - Age
  - Ethnicity
  - BMI
  - Late referrals (< 3 months pre dialysis)
  - Vascular access at entry

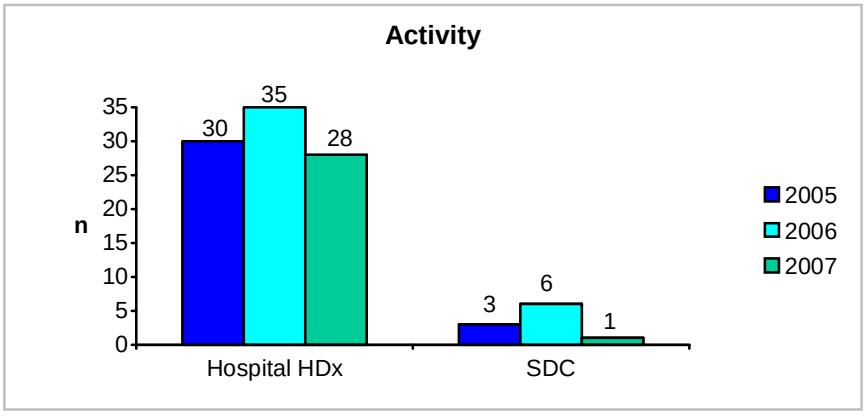
### Data Benchmark

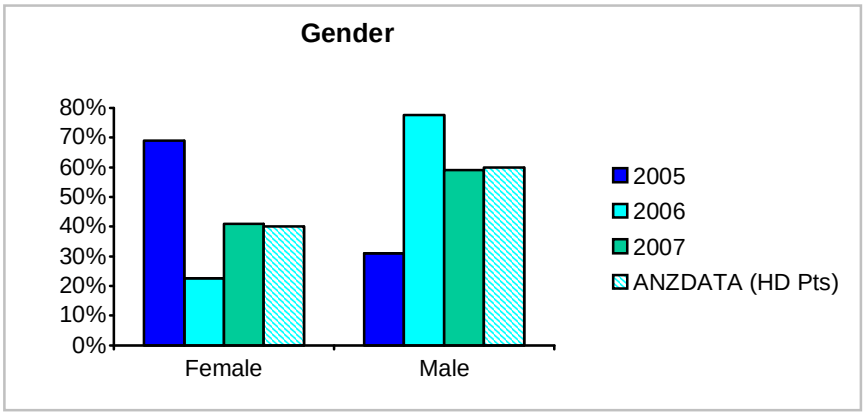
- Audit results are compared to the previous audits and ANZDATA 2007 report.

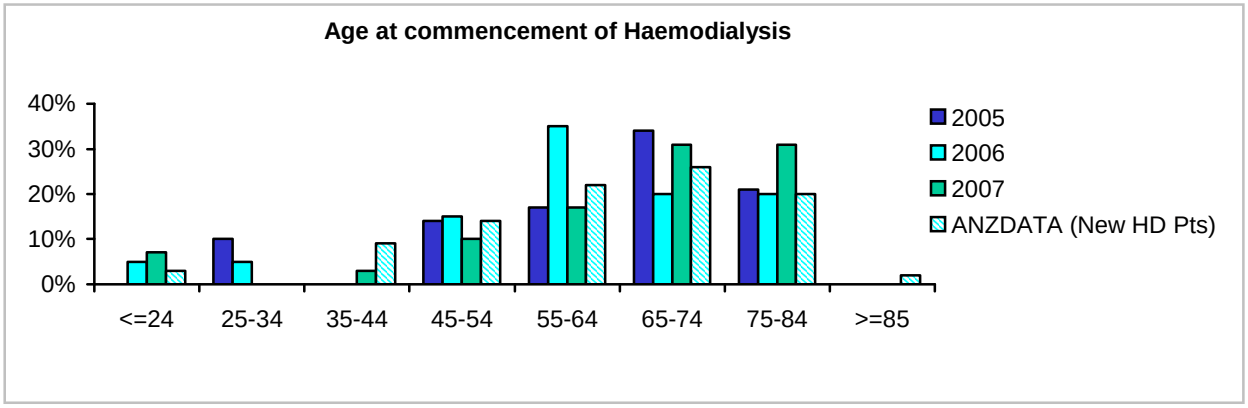
### Activity

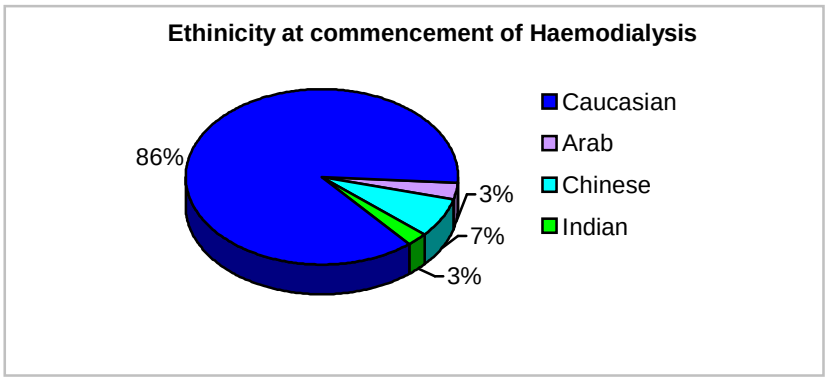
- 29 patients commenced incentre or home haemodialysis (directly) for ESRD with no previous dialysis in 2007 (excludes patients from PD, failed transplant patients and patients dialysed for <1month).

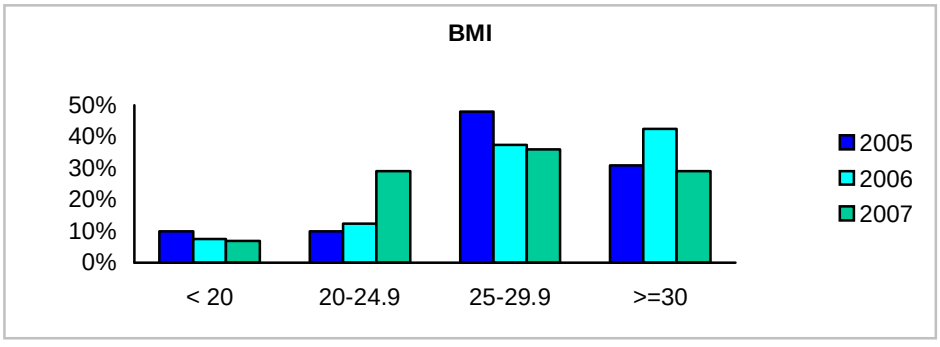
### Outcomes




Gender
80%
70%
60%
50%
40%
30%
20%
10%
0%
Female
Male
2005
2006
2007
ANZDATA (HD Pts)


Age at commencement of Haemodialysis
40%
30%
20%
10%
0%
<=24
25-34
35-44
45-54
55-64
65-74
75-84
>=85
2005
2006
2007
ANZDATA (New HD Pts)

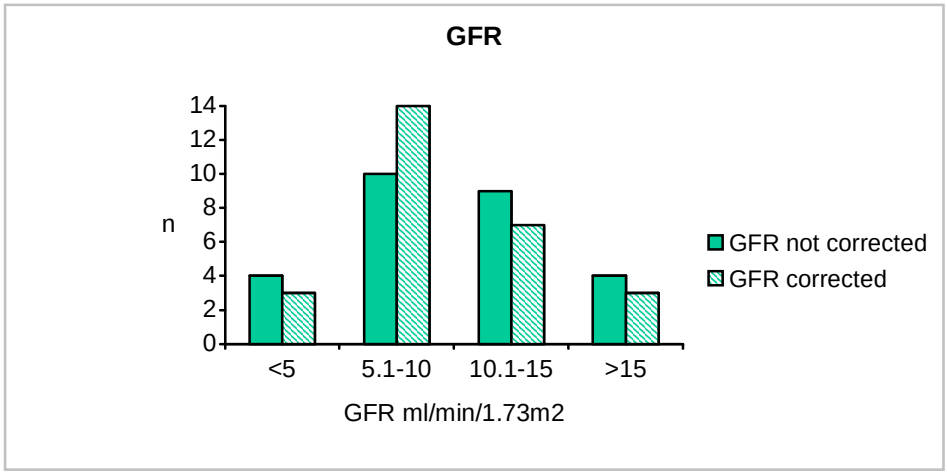

Ethinicity at commencement of Haemodialysis
86%
3%
7%
3%
Caucasian
Arab
Chinese
Indian


BMI
50%
40%
30%
20%
10%
0%
< 20
20-24.9
25-29.9
>=30
2005
2006
2007

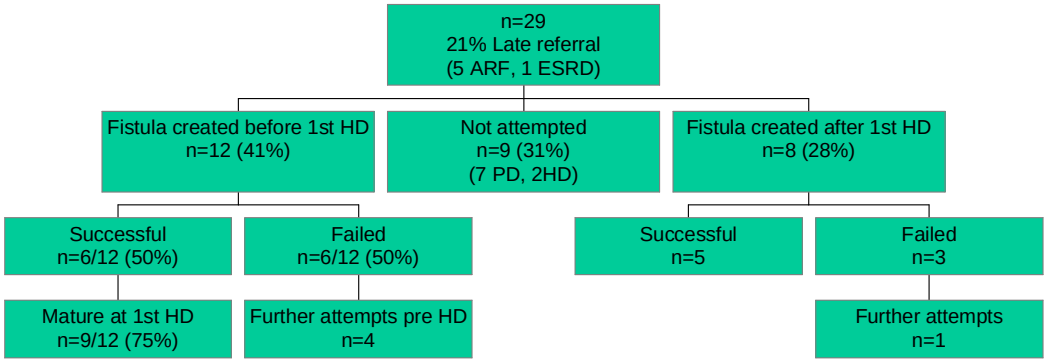
- BMI <20 indicates underweight, 25-29.9 overweight and ≥30 obese.

**Co-morbidities present at commencement of haemodialysis**

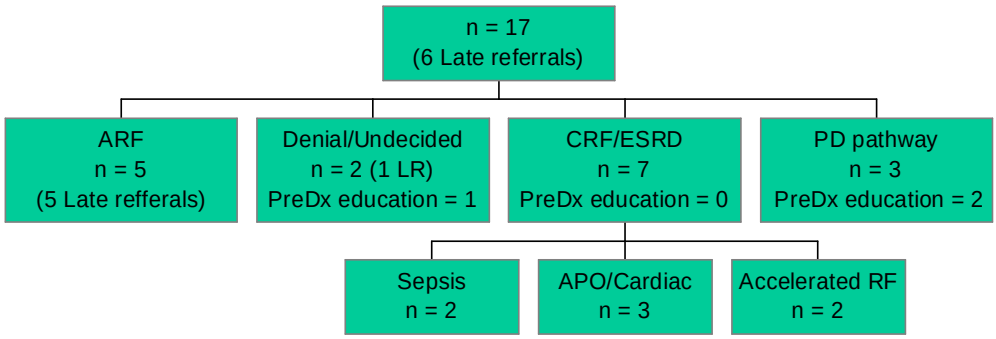
| Co-morbidity | St George 2006 | St George 2007 | ANZDATA (HD pts) |
|---|---|---|---|
| **Chronic Lung Disease** | | | |
| ▪ Yes | 12.5% | 28% | 17% |
| ▪ No | 87.5% | 72% | 83% |
| **Coronary Artery Disease** | | | |
| ▪ Yes | 37.5% | 41% | 45% |
| ▪ No | 55% | 59% | 55% |
| **Peripheral Vascular Disease** | | | |
| ▪ Yes | 17% | 3% | 27% |
| ▪ No | 83% | 97% | 73% |
| **Cerebrovascular Disease** | | | |
| ▪ Yes | 10% | 10% | 17% |
| ▪ No | 90% | 90% | 83% |
| **Diabetes** | | | |
| ▪ Yes | 45% | 31% | 46% |
| ▪ No | 55% | 29% | 54% |
| **Smoking** | | | |
| ▪ Never | 35% | 43% | 47% |
| ▪ Former | 45% | 57% | 40% |
| ▪ Current | 20% | 0% | 13% |
| **Late Referral** | 24% | 21% | 23% |

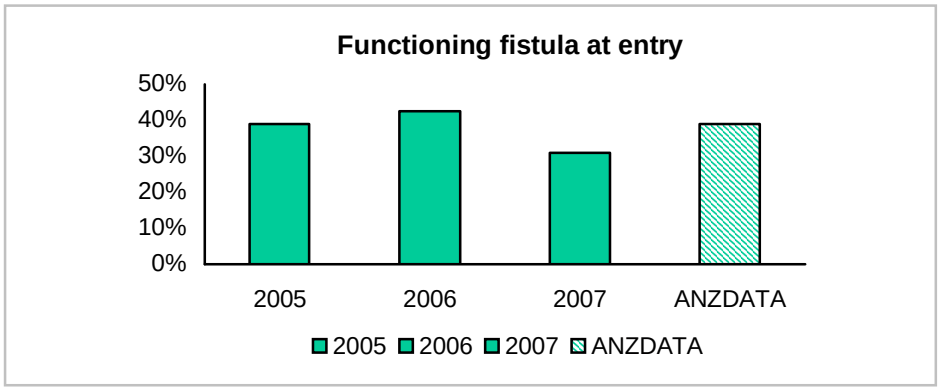


**Fistulas in patients commencing Haemodialysis**




**No access created before Heamodilaysis**




**Comments:**

- The average age of patients commencing haemodialysis was 65yr, median age 70yr. The median age increased by 19years compared to 2006 data. The ANZDATA report indicates the average age for all new patients was 61years and the median age was 63years. Sixty two percent of new patients commencing haemodialysis at St George are of age 65yr or older. Sixteen percent higher than ANZDATA 2007 report.
- Fourteen percent of patients were NESB.
- Overall co-morbidities were lower than ANZDATA 2007 report with the exceptions of chronic lung disease which was11% greater.

- The late referral rate reflects patients who were referred to nephrologists less than three months prior to commencing dialysis. The late referral rate was marginally lower than 2006 and that of the ANZDATA report.
- Twenty nine percent of patients commencing haemodialysis were considered obese with a BMI ≥30.
- The GFR is estimated by the Cockcroft-Gault formula. The Average corrected GFR was 10ml/min/1.73m$^2$ with a median GFR of 8.6ml/min/1.73m$^2$. Whilst the GFR not corrected for body surface area was 10ml/min/1.73m$^2$ for the average and median.
- Forty one percent of new patients had a fistula attempted in 2007 compared to 61% in 2006. The average time to access creation before commencement of haemodialysis was 251days (range 17-843days). The median time was 217 days. Fifty percent of these patients required further surgery on their access and 42% required a fistulagram prior to or within 1 months of cannulation.
- Seventeen patients had no access created before their first haemodialysis, six of whom were late referrals from ARF and one patient categorised as being in denial. The majority of patients without an access were known to the nephrologists with CRF but their renal function deteriorated more rapidly than predicted due to sepsis, cardiac causes or medication.
- Thirty one percent of patients had a mature functioning fistula for their first haemodialysis session, which was 10%, lower than 2006 and lower than that of the ANZDATA report (39%).

**Identified strengths and weakness:**

- Lower incidence of a mature functioning fistula at first haemodialysis session.
  - This may be due to a lower number of patients commencing haemodialysis than previous years. Seventy five percent of patients who had an access created prior to their first session, commenced with a functioning access compared to 64% in 2006. Hence access was prepared earlier in patients who commenced haemodialysis in 2007 than 2006.
  - A review of patients who did not have a functioning access was discussed in a Department meeting and was emphasised to send patients for pre dialysis education early to ensure the patient is adequately prepared for dialysis.

**Biochemical and haematological targets and dialysis adequacy audit.**

**Background and Activity Level**

- Routine monthly bloods are attended on haemodialysis patients.
- Blood results were audited in April and October 2007 from 132 chronic incentre haemodialysis patients.

**Outcomes being measured**

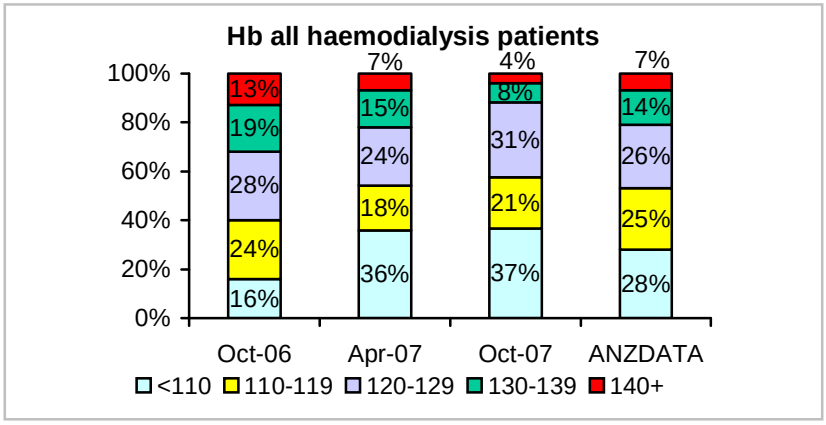
- Our aim is to compare our unit's performance against the National recommended guidelines (CARI) for the following parameters: Ca, PO4, Corrected Ca, Ca PO4 product, Albumin, Mg, Hb, Fe studies, Bicarbonate and dialysis adequacy (KT/V).
- Audit results are also compared to previous audit results and the ANZDATA 2007 report.
- Lipid target range is set by the National Heart Foundation for high risk patients

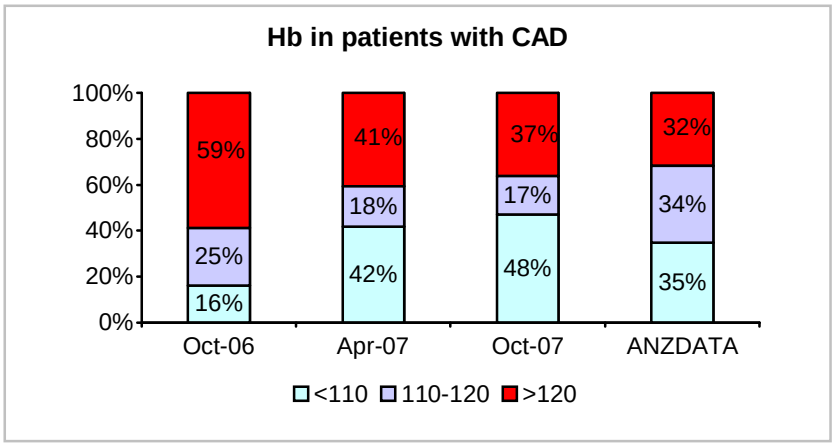
**How did we Record, Store and Analyse the Data?**

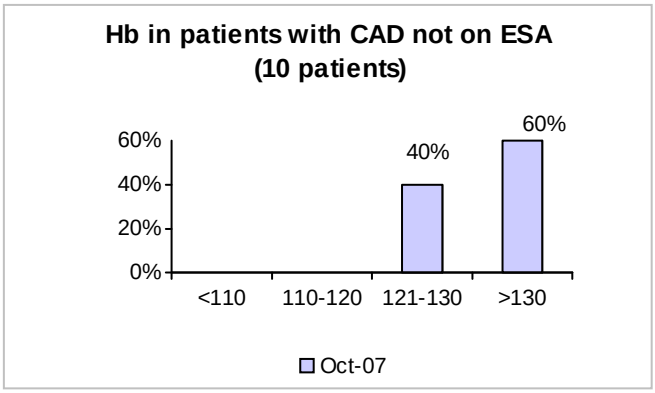
- Blood results were entered into an Excel Database.
- Analysis of data and basic statistics was performed using the SPSS 15 statistical program.

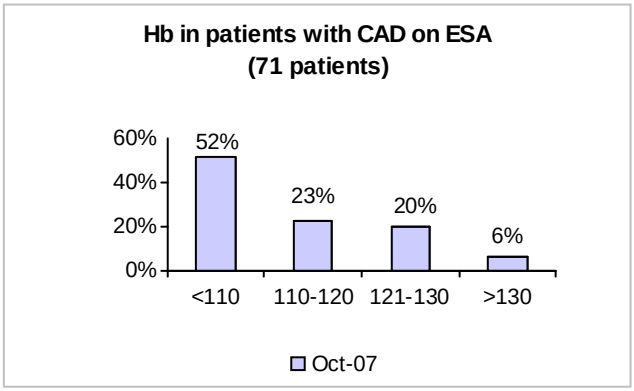
**Outcomes & Recommendations:**

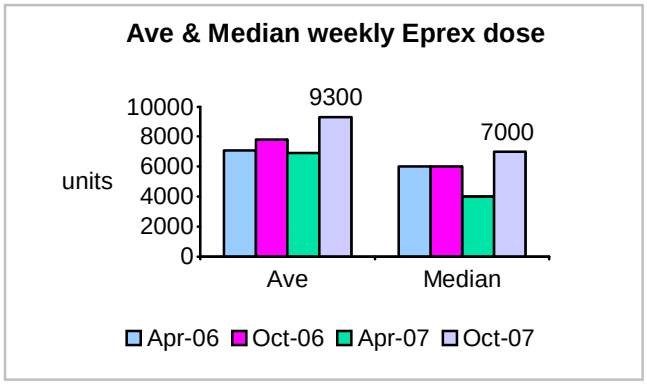
<u>Haemoglobin</u>

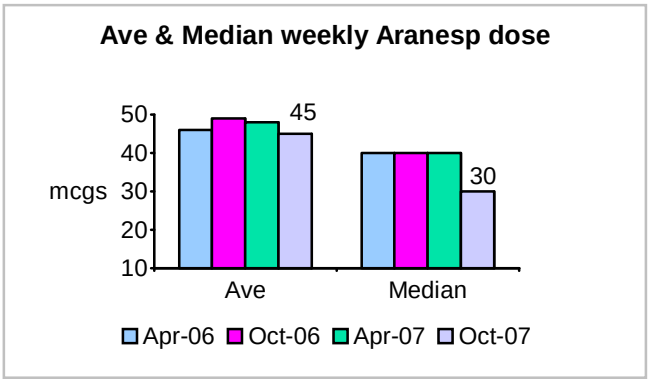




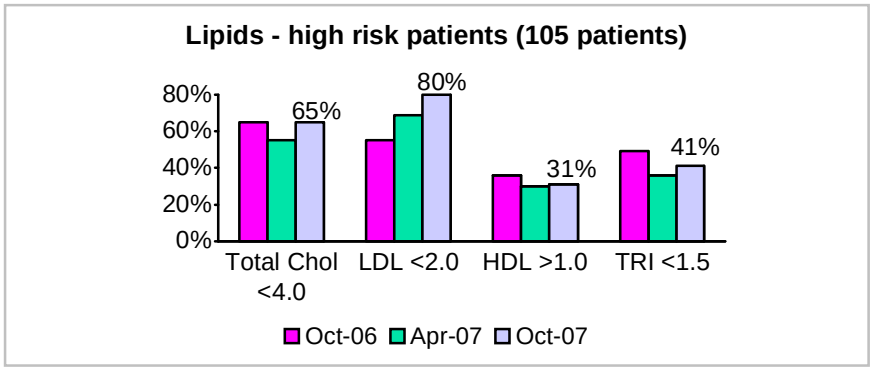




**Comments:**

- The renal department decided to monitor Hb in relation to ESA usage at the last biochemical audit presentation in May 2007.
- Literature states 30% or fewer patients achieve the recommended Hb target of 110-120g/L within a single month (Lacson *et al* 2003 and Ofsthun *et al* 2007 cited in KDOQI 2007). Hence due to fluctuations and variability in Hb levels, KDOQI clinical practice recommendation for target Hb should *generally* be in the range 110-120g/L.
- Out of 71 patients' who have CAD and are on ESA, 52% had an Hb<110g/L (17% had an Hb<100g/L). Attributing causes for an increase in anaemia were 6 patients were hospitalised during data collection, delays in increasing ESA dose and Hb not monitored 2/52 post an ESA dose change. Those patients admitted during this audit had elevated ferritin levels suggesting inflammatory response and hence iron therapy was withheld.
- Literature indicates achieving a target Hb takes longer to achieve with Aranesp than with Eprex (Papatheofanis *et al* 2007). Fishbane and Berns (2005 cited in KDOQI 2007) state more than 60% of haemodialysis patients require frequent ESA dose adjustments to achieve the recommended Hb target range.
- The median Hb for patients on ESA during this audit was 113g/L (79-142g/L).
- Twenty five percent of patients with an Hb<100g/L were iron deficient and hence commenced iron replacement therapy.
- KDOQI recently updated Hb targets and recommend in dialysis patients receiving ERT the Hb target should not exceed >130g/L (KDOQI 2007). A greater emphasis and education since last audit on reducing or withholding ERT dose once Hb>130g/L has resulted in only 11% of all patients having an Hb>130g/L.

- The number of patients on ESA is similar to that in previous audits. Seventy nine percent of patients are on Aranesp, 7% on EPREX and 14% not on ESA. The average and median weekly dose of EPREX has increased compared to previous audits whilst the average and median weekly Aranesp dose has decreased.

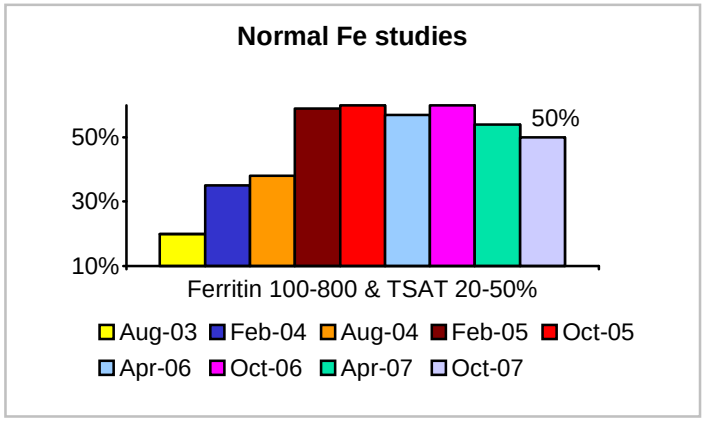
Lipids

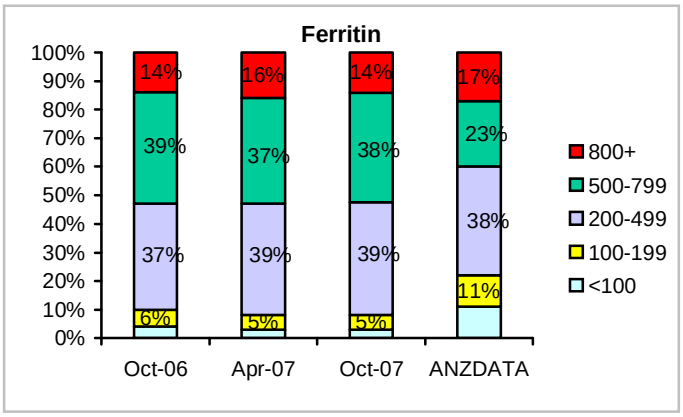


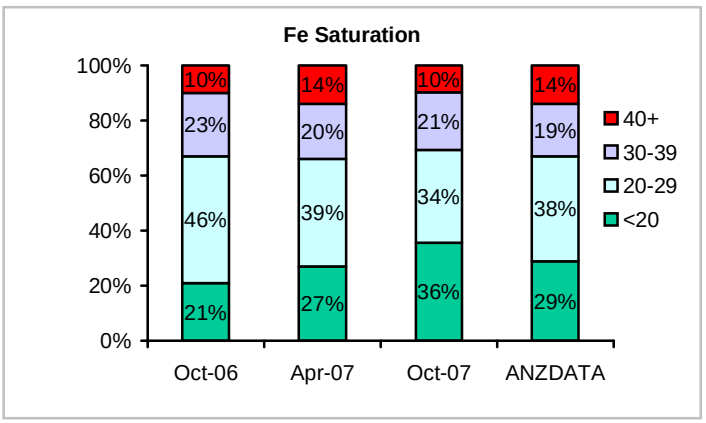

**Comments:**

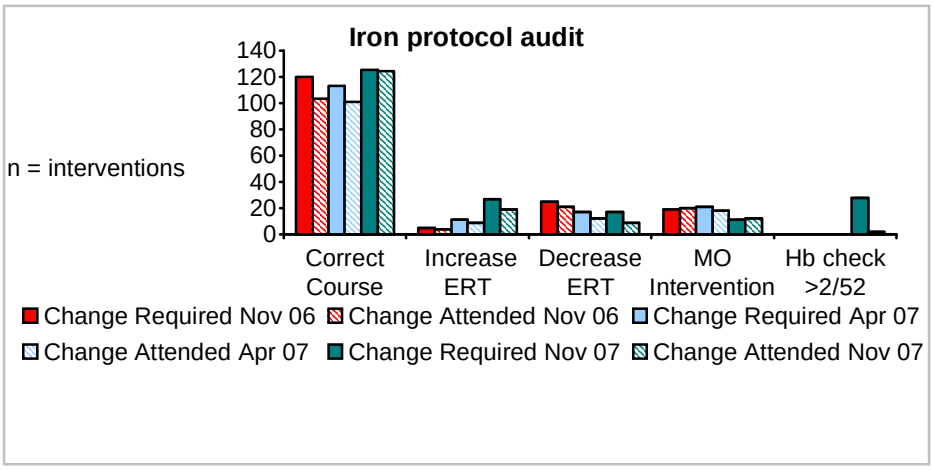
- Ranges are recommended by the 2005 national heart foundation.
- No significant differences occurred although there was a 10% improvement in patients achieving the recommended ranges for both total cholesterol and LDL.
- Data is collected only on high risk patients i.e. with or suspected CAD, PVD, CVD, DM or obesity. Eighty percent of incenter haemodialysis patients were considered high risk during October 2007 audit.

Total Iron studies



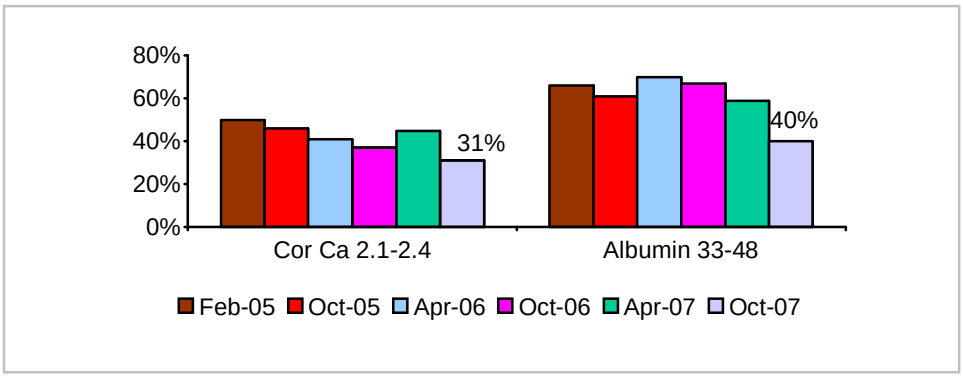






**Comments:**

- Fifty percent of all patients in October 2007 were iron replete with a ferritin level between 100-800ng/mL and iron saturation between 20-50%. Marginally lower than April 2007 audit but no significant difference seen.
- Fourteen percent of patients in October 2007 had a ferritin level >800ng/L which was similar to previous audits. Most of the high ferritin levels correlate with patients' recent hospital admission (infection, MI or surgery).
- The iron audit is conducted in May and November each year, which reviews compliance with the nurse initiated protocol. The correct course was chosen 99% of the time in the last audit. 70% of the time the ESA was increased as required and 53% of the time the ESA was decreases or ceased as required. This was lower than previous audits and it was emphasized to nursing staff to request the MO to review ESA dose. It was noted there was also a delay in having ESA prescriptions changed. Rechecking Hb 2/52 post ESA dose change was poorly performed with only 8% reviewing Hb. Again it was noted that due to the delay in changing the prescription dose monitoring the Hb often coincided with monthly bloods.
- Once patients become iron overloaded (ferritin>800ng/L and or iron saturation>50%), iron therapy is withheld for 3months and recommenced once ferritin level<500ng/L and iron saturation<40%. Often these patients develop functional iron deficiency as ferritin levels remain >500ng/L and iron saturation falls below 20%. Fifty percent of the patients with a previous iron overload developed functional iron deficiency in this audit alone.

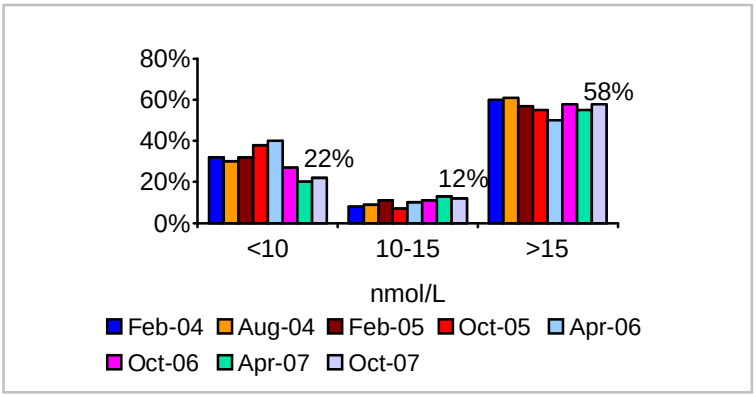
<u>Corrected Ca & Albumin</u>



**Comments:**

- A Mann-Whitney *(U)* performed on corrected calcium between October 2007 and April 2007 indicated p=<0.005. 65% of patients had corrected calcium above 2.4mmol/L possibly affected due to low albumin levels.
- A Kruskal-Wallis *(H)* performed on albumin between October 2006, April 2007 and October 2007 resulting in p=0.000. There was a 20% difference seen in normal albumin levels between this audit and April 2007. The dieticians noted a trend in more malnourished inpatients during this audit. Several patients continue having intradialytic parental nutrition.

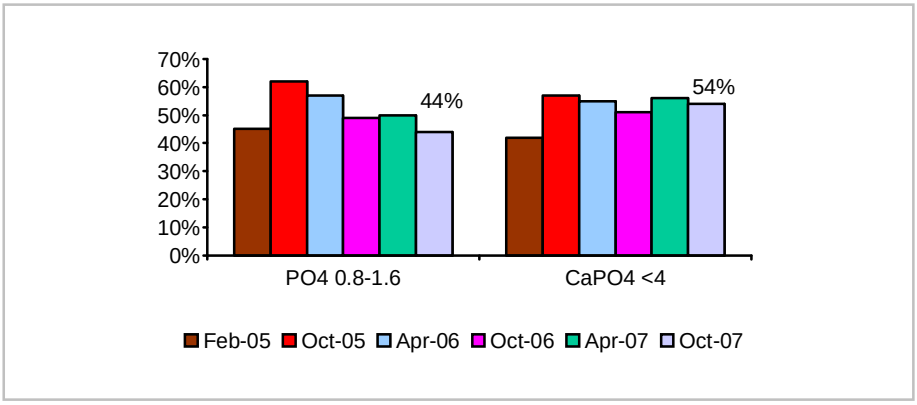
PTH




**Comments:**

- Patients with parathyroidectomies were excluded in the data if PTH <10. In Oct 2007 nine patients data was excluded.

Phosphate & CaPO4 product

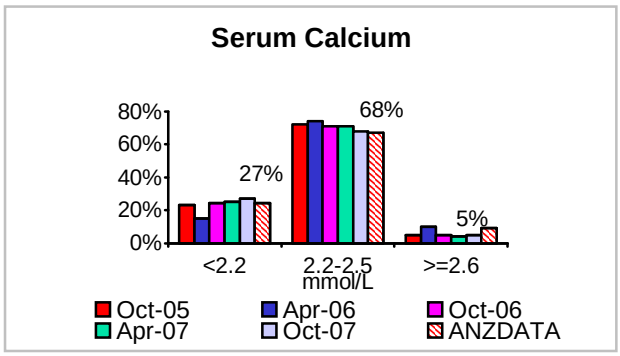


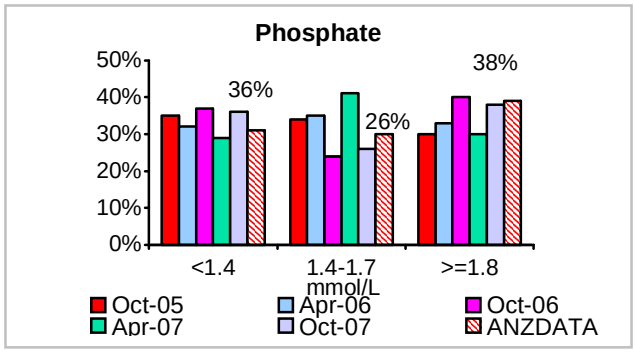

**Comments:**

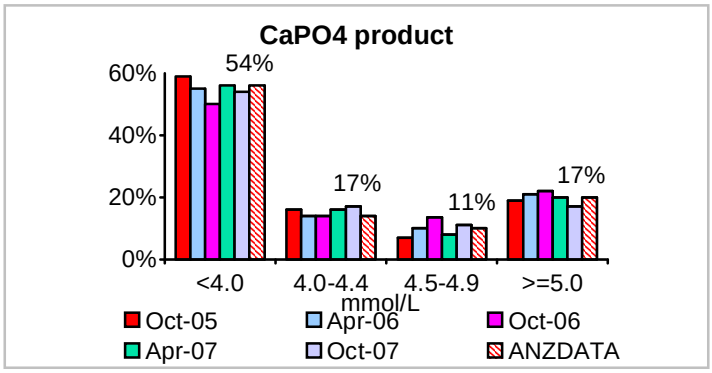
- Minimal changes occurred with Phosphate & CaPO4 product regardless of implementing the nurse initiated calcium and phosphate management plan early 2007. Further formal education sessions will be implemented to facilitate nurses' learning.

- The dieticians evaluation of phosphate management in our unit highlights patients still have a poor level of food knowledge regardless of continual review and education. Often the patient becomes confused with conflicting information received from nursing and medical staff in regards to high phosphate foods. Poor compliance and incorrect timing with the meal of prescribed phosphate binders also occurred during dialysis times.
- Some recommendations from the dieticians are to regularly educate staff to ensure continuity of the correct information is provided; revaluate current diet educational material and adopt a protocol driven $PO_4$ binders prescription by dieticians.

Serum Calcium Comparison with ANZDATA



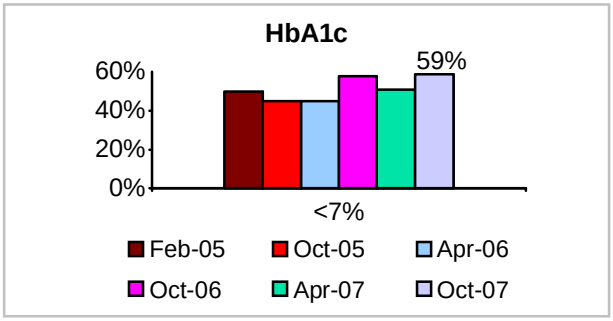




**Comments:**

- Overall calcium and phosphate results are comparable with the 2007 ANZDATA report.

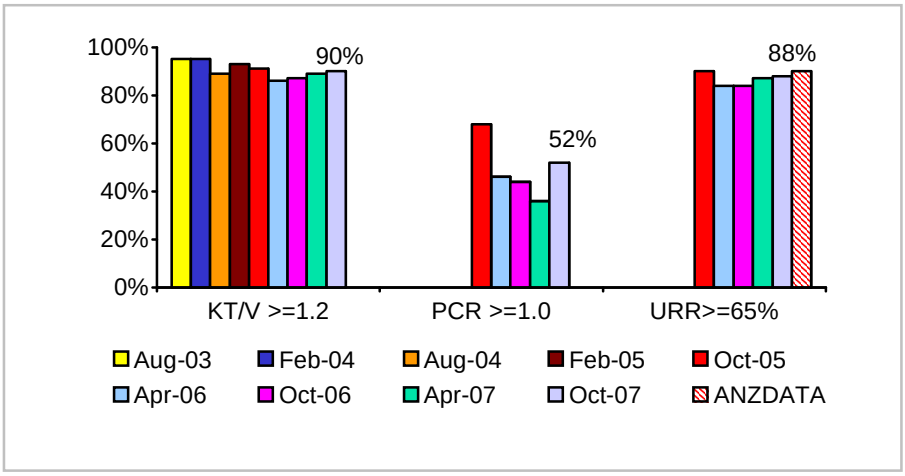
HBA1C




**Comments**

- Seals pathology changed the HbA1c range in 2007 from 4.4-6.4% to 4-6%. KDOQI published guidelines in Feb 2007 for diabetic management in CRF, which recommends HbA1c <7%. The diabetic focus group liaised with Dr Diamond who also agreed with these recommendations. Hence the department acknowledged the new parameter.
- Data was collected on 60 (45%) diabetic patients during the last audit.
- The diabetic nursing practice development group developed management guidelines for the diabetic patients on dialysis in 2007. Patient educational resources were also developed and distributed to patients.

Adequacy




**Comments**

- Dialysis adequacy continues to be achieved and remains comparative with ANZDATA.
- Malnourishment remains an issue with 52% of patients having an inadequate PCR, which supports the significant changes seen in albumin and corrected calcium levels.

**Identified strengths and weakness:**

- Through increased awareness and education to cease or withhold ESA in patients with Hb>130 a reduction in Hb>130 was (12%) seen compared with previous audits (22%) and the ANZDATA (21%) report.
- Improvements are required in monitoring Hb 2 weeks post changes to ESA to prevent large fluctuations in Hb levels.
- There was 99% compliance in administrating the correct iron course with the nurse initiated iron protocol. A suggestion of utilising Vit C to help mobilise stored iron in patients with functional iron deficiency was discussed at a Department meeting. Abnormal iron studies in the next audit are to be highlighted to each nephrologist to review and consider.
- Poor patient compliance and timing of phosphate binders during dialysis was identified by the dieticians' review on phosphate management. Further education and strategies will be implemented to improve compliance.
- An improvement in glucose control amongst diabetic patients occurred. The diabetic nursing practice development group developed management guidelines for the diabetic patient on dialysis in 2007 and patient educational resources were developed and distributed to diabetic patients.

## HAEMODIALYSIS WATER QUALITY

### Background and Activity Levels

- The water quality is audited in the 4 West dialysis unit 2nd monthly for micro-organisms, aluminium, chloramines and total chlorine.
- Full element analysis is conducted biannually.
- The Biomedical department is responsible for collecting the water specimens and follow up abnormal results.
- 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 using a chlorine test kit.

### Outcome being measured

| Date | H2O (<200 CFU/mL) | Dialysate (<200 CFU/mL) |
|---|---|---|
| Jan 07 | 4 samples >50-<200 | Normal range |
| Mar 07 | 3 samples >50-<200 | Normal range |
| May 07 | RO 5117 60 CFU | Normal range |
| Aug 07 | Missed sampling in July. | Normal range |
| Oct 07 | BME 83 | Normal range |
| Dec 07 | RO 4618 >250 CFU, Repeat sample 18 CFU | Normal range |

| Date | Elements<br>Al 0.01mg/L, Chloramines 0.1mg/L, Total Cl 0.5mg/L |
|---|---|
| **Jan 07** | ↑F pre treatment |
| Mar 07 | Normal range |
| May 07 | Normal range ↑F pre treatment |
| **Aug 07** | Missed July |
| Oct 07 | Normal range |
| Dec 07 | ↑Al water plant filters |

### Comments:

- The audit ensures results comply with 2004 AAMI standards.
- AAMI guidelines indicate action is required when results are >50CFU/mL. Microbiology water samples taken throughout the year regularly resulted in >50CFU/mL especially from both portable ROs. Frequent disinfection and retesting resulted in a normal range. As a consequence of recurrent abnormal results from the large portable RO it was discarded in January. Retesting was not performed after the elevated results in March due to a lack of containers and biomedical staff.
- Retesting has added extra costs to the water management on 4west dialysis.
- Elevated fluoride and aluminium specimens were within the recommended AAMI range and reported to the Biomed department.
- Gambro will take over water sampling and maintenance of the central water plant and portable ROs in 2008. New portable ROs will also be purchased with the new PPT and replace the previous ROs.

### Identified limitations and strengths:

- Lack of staff in the biomedical department resulted in missed water sampling. The process of Gambro performing water testing and the purchase of new portable ROs in 2008 may improve the overall water management.

## 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 at one and six weeks post surgery to assess maturity of access.
- Data includes access used for new patients commencing their first haemodialysis in 2007 as well as current home and incenter haemodialysis patients.

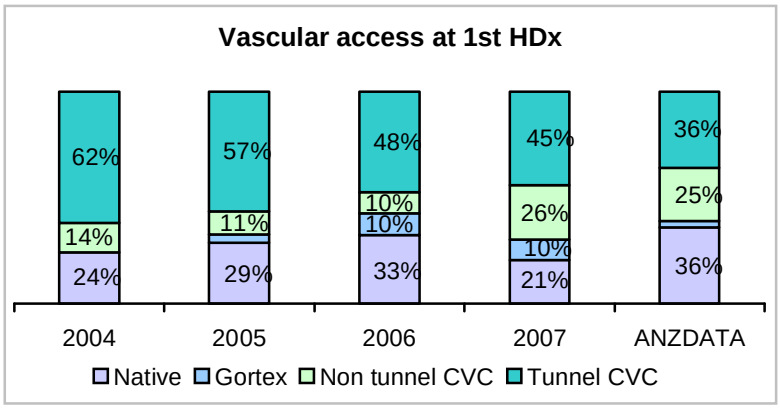
### How did we Record, Store and Analyse the Data?

- 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 2007 and current patients access at 31st December 2007.

### Data Benchmark

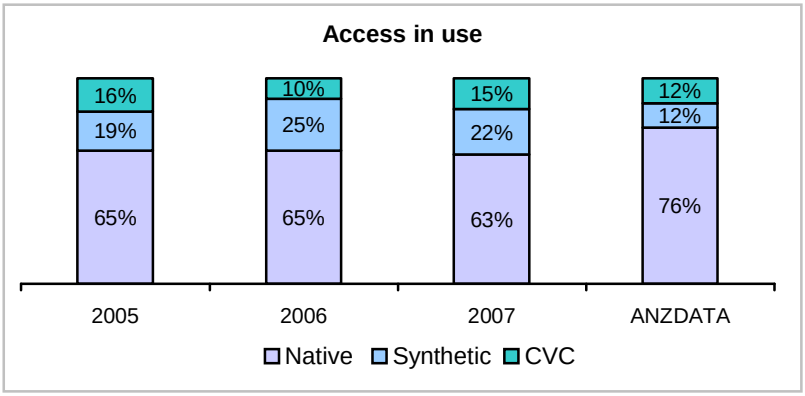
- Data is benchmarked against ANZDATA 2007 report and KDOQI 2006 guidelines.

### Outcomes



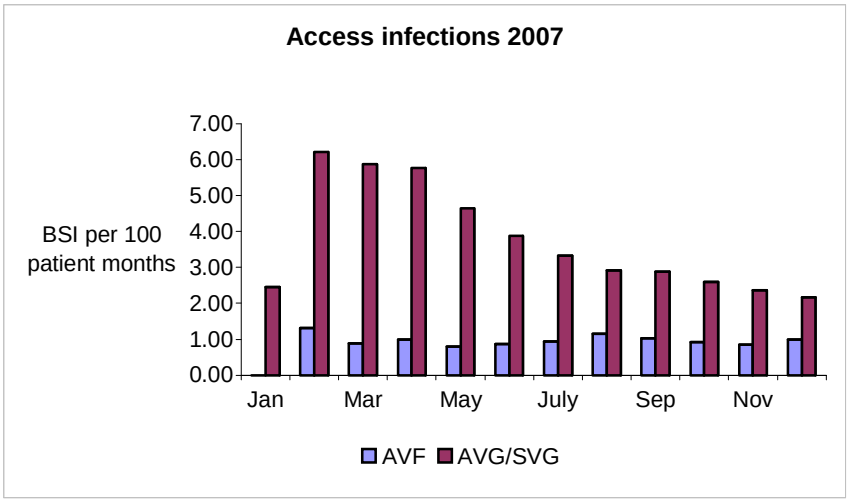

### Comments:

- The ANZDATA 2007 report indicates the overall use of native fistulas as an initial access is decreasing and CVC are increasing.
- Thirty one percent of new patients had a mature functioning fistula for their first session. ANZDATA 2007 reports the use of vascular access (native and graft) for first dialysis at 39%.
- The incidence of non-tunneled CVC used for first dialysis (26%) increased from previous years. This was due to a unit decision on identifying suitable patients early that presented with A/CRF or ARF for the PD pathway. These patients were dialysed using a non-tunneled CVC short term prior to a PD catheter insertion, then commenced on PD early rather than taking up a haemodialysis position. The incidence of tunneled CVC use remains higher at St George (45%) compared to ANZDATA 2007 report (36%) although the rate of tunneled CVC is lower than previous years.




**Comments:**

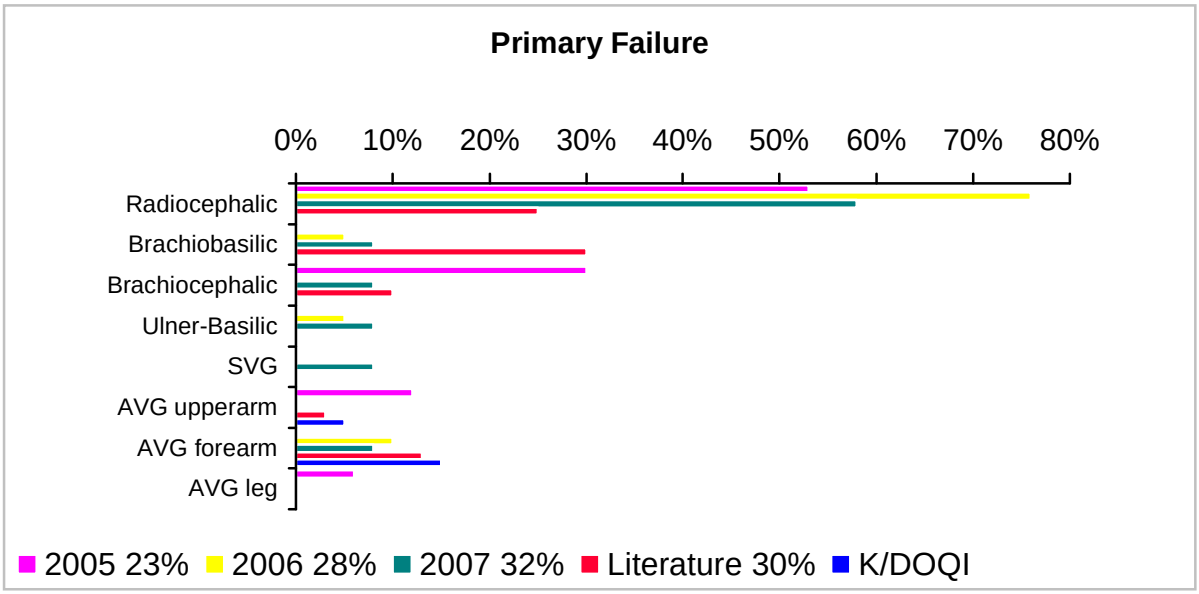
- The National Kidney foundation Kidney Disease Outcomes Quality Initiative (KDOQI) 2006 evidence based practice guidelines recommends fistula use in 40% of prevalent patients. Sixty three percent of patients at St George have a native fistula.
- The KDOQI 2006 guidelines suggest <10% of chronic haemodialysis patients have a permanent catheter. Six percent of the St George population has a permanent catheter access for dialysis, which is increasing each year.




**Comments:**

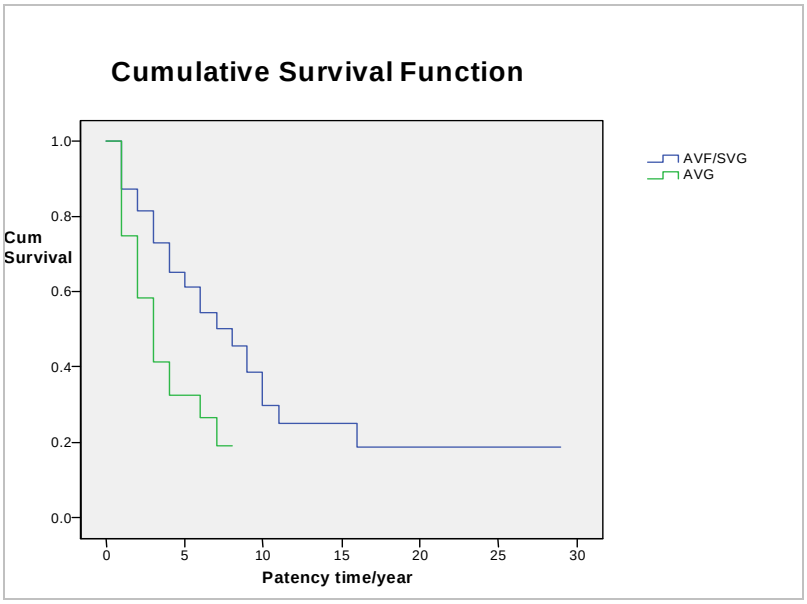
- In early 2007 the incidence of infection in AVF and AVG increased. Blood stream infection per 100 patients months was 4.97 for an AVG and 1.32 for an AVF in February. A comprehensive review of each case was analysed and no common finding was identified for the cause of such an increase in infection. In response to the increased infection rate protocols and policies were changed to prevent further occurrence. This included changing cleaning solution used to prepare the access for cannulation and cleaning the cannulation trolleys, changing cannula taping methods, implementing the use of antiseptic wash for pre fistulagrams and access surgery, as well as implementing the use of a prophylactic antibiotic pre fistulagrams and access surgery.

- A regular infection control meeting was established with senior nursing staff and the infection control department, which identifies and discusses infection control issues related to the renal department.
- KDOQI 2006 guideline recommends a fistula infection rate <1% and graft infection rate <10% during the use-life of the access.




**Comments:**

- Thirty eight new access or 1st access were formed in 2007 with a primary failure rate of 32%. Primary failure is defined as an access that never provided reliable haemodialysis or failed within 3 months of surgery. Risk factors for primary failure are wrist fistulas, older patients, obesity, female, diabetics, PVD, CVD, previous failed vascular access, cephalic vein <2.0mm on ultrasound in forearm.
- The most common site for an AVF at St George is the radial-cephalic and less common is the brachial-basilic, which may suggest a higher rate of primary failure of radial-cephalic at St George compared to the literature. The literature reports a primary failure rate of 30%.




**Comments:**

- Cumulative patency is defined as the number of access that remain patent regardless of the number of interventions during a time period.
- The literature indicates cumulative patency for radio-cephalic fistulas of 53% at 5 years and 45% at 10 years. PTFE grafts at 1 year 67%, 2 years 50% and 4 years 43%. KDOQI only provides rates for AVG which are 70% at 1 year, 50% at 2 and 3 years.
- KDOQI 2006 also recommends AVG patency >2.0years (by life-table analysis) and AVF patency >3.0years (by life-table analysis). The median survival time (time at which half the subjects have reached the event) for St George patients AVG was 2.5 years and AVF 7.0 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 functioning access.

**Identified limitations and strengths:**

- An increased infection rate in AVF and AVG resulted in an extensive review of the literature and implementing several strategies within the renal, radiology, surgical and infection control departments in order to reduce infection rates. Monthly collection and monitoring of AVF and AVG infection rates was commenced and discussed at regular Department meetings.
- Primary failure rates remain a problem possibly due to our aged population.

## CENTRAL VENOUS CATHETERS

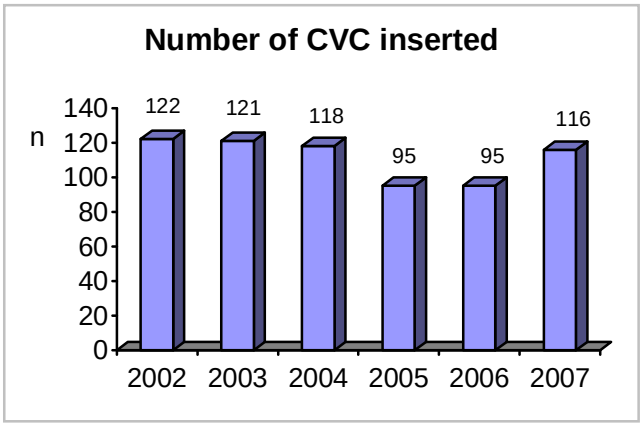
### Background

- Central venous catheters (CVC) are required to provide temporary access for haemodialysis.
- Infection and complication rates of CVC are monitored and reported.

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

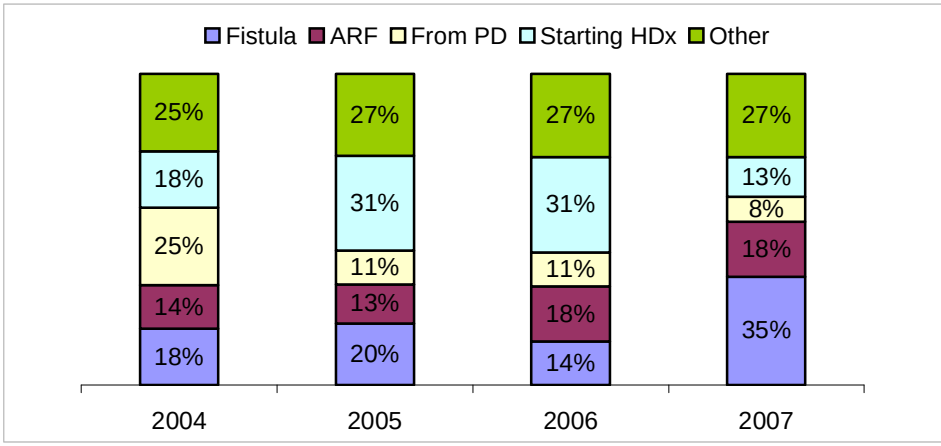
- Data is collected and entered into the access Excel database, which includes reason for insertion and removal, insertion site, type of catheter, number of catheters per patient and complications.

### Activity Level




- The number of catheters inserted for haemodialysis has increased from previous years. The type of catheters inserted in 2007 remains predominantly Bard tunneled cuffed internal jugular catheters 70%. Thirty percent were temporary Arrow non–tunneled femoral or subclavian catheters.

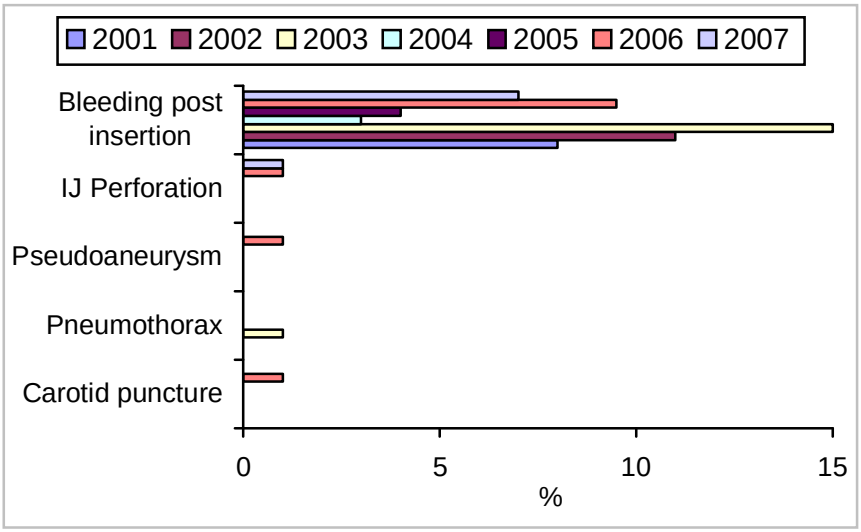
### Reason for insertion of catheters in 2007



**Comments:**

- There was an increased incidence of access problems in 2007 that required CVC insertion. Nine patients required CVC insertion due to infected accesses, 4 patient's AVF were immature and 27 accesses were blocked.
- In 2007 all haemodialysis nursing staff were educated on monitoring vascular access for early detection of dysfunction and visual flow charts were designed to aid assessment. A vascular access practice development (PD) group was formed with nursing staff in August 2007 to improve access outcomes. The PD group is currently focusing on reviewing all access competencies in preparation for yearly assessments of dialysis staff. Additionally the group is looking at implementing tools to ease with physical assessments.
- The number of patients transferring from PD and requiring a CVC was similar to 2006. Fourteen patients transferred from PD to HDx either temporarily or permanently. Two patients had an AVF, one of which was immature. The vascular access nurse has reviewed all PD patients with permanent access to assess for maturity and suitability of cannulation.
- Patients' requiring a CVC to start HDx has reduced in 2007 by 18% compared to 2006.
- Other includes replacing a non-tunneled catheter with a tunneled, malfunction of the catheter and replacing an infected or faulty catheter which was been stable over the last 4 years.

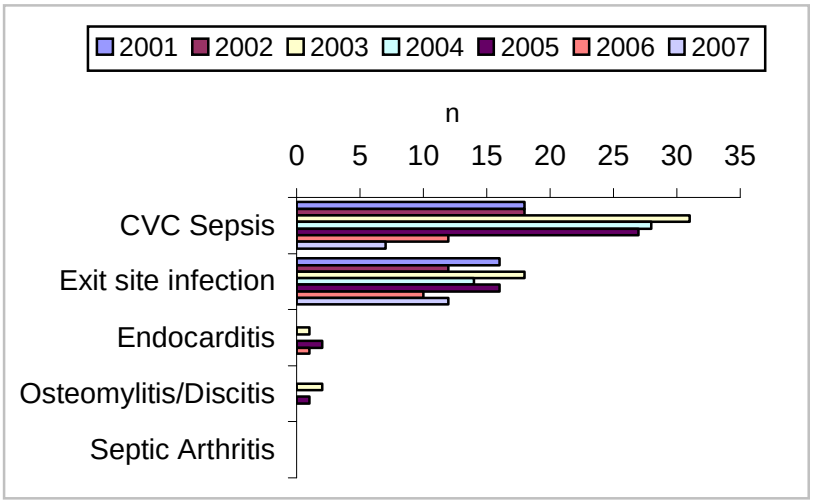
**Complications related to insertion**




**Comments:**

- Bleeding post insertion occurred mainly with ARF and uraemic ESRD patients. All complications resolved without further harm to the patients.
- A non tunnelled catheter was inserted into the subclavian artery in an ICU patient which resulted catheter removal and replacement.
- There was a reduced rate of catheters malfunctioning in 2007 (9%) compared to 2006 (12%).

## Catheter infection rates

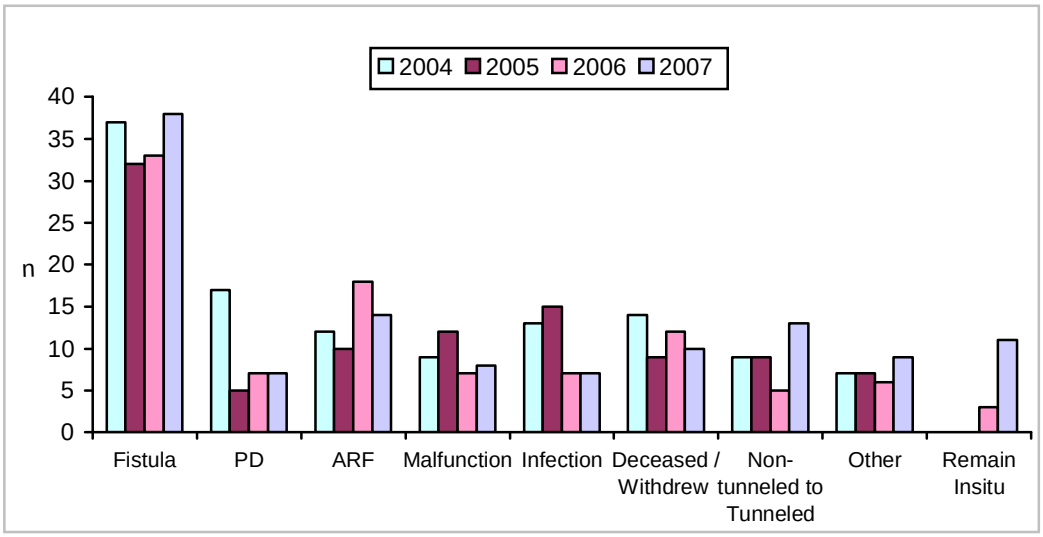



| | Catheter related bacteremia (CRB) rate | Exit site infections (ESI) rate |
|---|---|---|
| 2007 | 6% (0.81episodes/1000catheter days) | 10% (1.39 episodes/1000catheter days) |
| 2006 | 12.5% (1.24episodes/1000catheter days) | 10% (1.03 episodes/1000catheter days) |
| 2005 | 28% (3.0 episodes/1000catheter days) | 17% (1.7 episodes/1000catheter days) |

**Comments:**

- The use of the gentamicin/heparin lock instilled after each catheter is accessed continues to reduce catheter related bacteremia rates. In 2007 the prophylactic lock was implemented in non tunnelled catheters which further reduced the infection rates.
- KDOQI 2006 guidelines recommend tunnelled catheter related infections <1.5 episodes/1000 catheter days, <10% at 3 months and <50% at one year.
- Gentamicin levels are monitored randomly in all patients with CVC with all results <0.5mg/L indicating no toxicity. There were no gentamicin resistant organisms detected in this group.
- Medihoney was implemented in 2007 to further reduce exit site infections. Patients received an application of Medihoney at the catheter exit site as part of their routine dressing care. Exit site infection rates increased in 2007 and the department has decided to discontinue the Medihoney use in 2008 and return to normal exit site care.
- The main causative organism in 2007 for CRB was MRSA and for ESI was MSSA. Due to reduced CRB only one catheter required decontamination in 2007.

**Reason for catheter removal**

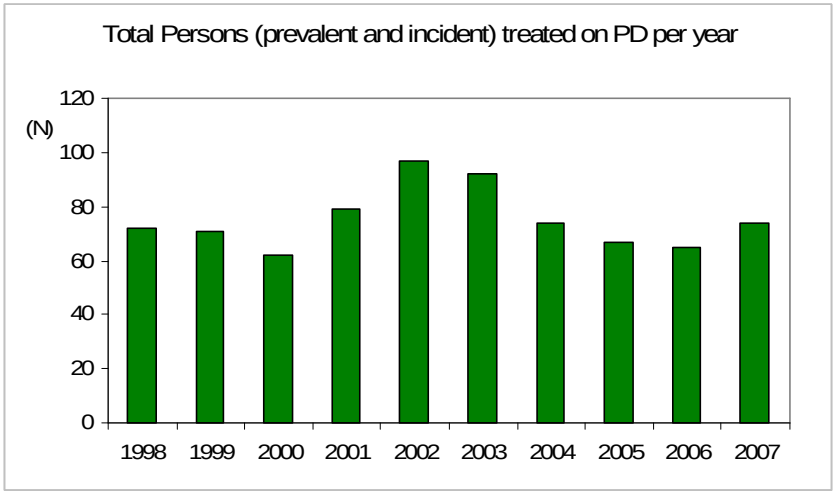


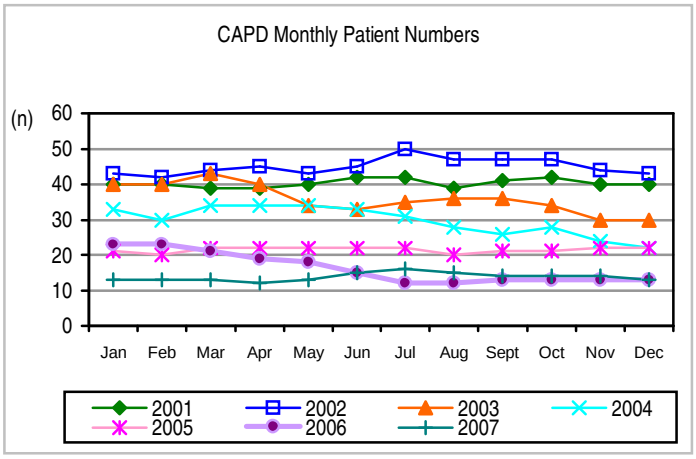

**Comments:**

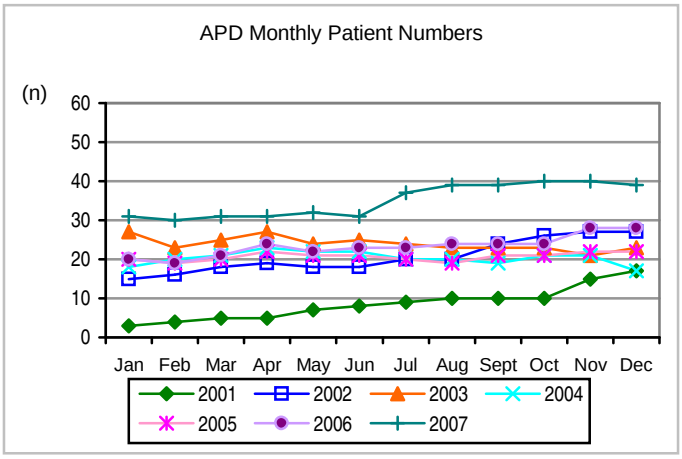
- The main reason for removal of CVC remains fistula maturation.
- The number of CVC removed due to CRB, ESI or clinical sepsis continues to be low since implementation of the gentamicin/heparin lock. Other indicates patients transferred to other units and insertion problems.
- The average number of days non tunnelled catheters were insitu in 2007 was 7 slightly higher than previous years due to more patients commencing PD early. The average number of days a tunnelled catheter was insitu was 102 days, which was similar than previous years.

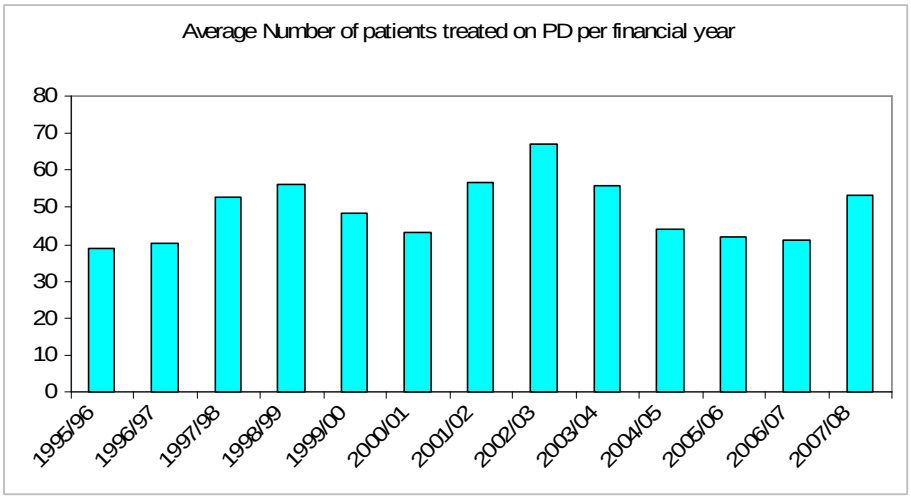
## PERITONEAL DIALYSIS

The peritoneal dialysis (PD) unit has increased its number of prevalent and incident patients in 2007 with a net gain of 11 patients. A total of 74 patients were treated on PD during the year compared to 65 in 2006 and 67 in 2005. In December 2007 the proportion of patients receiving automated peritoneal dialysis (APD) was 75%, and the proportion of continuous ambulatory peritoneal dialysis (CAPD) was 25%. Our APD population is still over and above the proportion reported by ANZDATA (2007) of 48%. This has been a deliberate strategy to enhance the appeal of PD for our patients thereby increasing the number of home patients.



## Comparison with:

### The ANZDATA 30th Annual Report 2007 (data to 2006)

- ANZDATA results show an increase in the prevalence of people using automated peritoneal dialysis (APD), up 19% Australia wide, which is similar to the growth experienced by St George in 2006. The St George peritoneal dialysis unit continues to increase the numbers of patients on automated peritoneal dialysis, in December 2007 the APD population increased by 7% from 2006 while the CAPD population continues to decline; down by 7% from December 2006.

| | | |
|---|---|---|
| **APD** | *ANZDATA 48% (969/2021)* | *St George 75%* |
| **CAPD** | *ANZDATA 52% (1052/2021)* | *St George 25%* |

## Patient Flow – Peritoneal Dialysis

**Balance carried forward: Peritoneal dialysis patients as at 01.01.2007 (n=41)**

| | | | |
|---|---|---|---|
| In | New Patients | 20 | |
| | New patient transfer from Hd | 9 | |
| | Returns from HD | 3 | |
| | Transfers from other units | 1 | |
| | Subtotal | | 33 |
| Out | Transplants | 2 | |
| | Transfer to other units | 1 | |
| | Transfer to Home Haemodialysis | 0 | |
| | Temporary Transfers to Haemodialysis | 4 | |
| | Permanent Transfers to Haemodialysis | 10 | |
| | Withdrawal from dialysis | 2 | |
| | Acute dialysis end | 1 | |
| | Deaths on CAPD | 2 | |
| | Subtotal | | 22 |
| | **Net Gain** | **11** | |
| | **PD patients at end of 2007 =** | | **52** |

**Peritoneal Dialysis activity rates using the ANZDATA 30th annual report for comparison**

| | St George 2007 (%) | ANZDATA 2007 (%) |
|---|---|---|
| Transplants | 4 | 7 |
| Change to haemodialysis permanent | 19 | 21 |
| Change to haemodialysis temporary | 8 | 5 |
| Deaths on Dialysis (PD)* | 4 | 11 |
| Deaths due to withdrawal* | 4 | 3 |

Note: The rates are calculated using the total number of patients on peritoneal dialysis at 31.12.2007 (n=52), the method used by ANZDATA to calculate their rates. *ANZDATA rates in this report are calculated to exclude ages <15 years where possible. Transplants include < 15 years as an age breakdown was not available for PD.

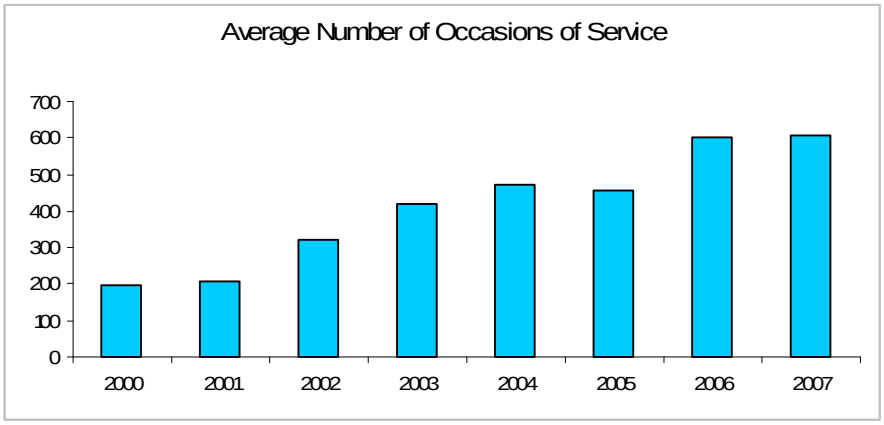
Patients changed to haemodialysis for a variety of reasons:

- Surgery including hernia (n=4)
- Infection (major cause) (n=5)
- Inadequate dialysis (n=1)
- Dialysate leak (n=1)
- Diverticulitis (n=1)
- Inadequate solute clearance (n=1)
- One patient had insertion of Tenckhoff catheter but did decided not to proceed with peritoneal dialysis after initiating training.

The percentage of deaths on peritoneal dialysis is considerably lower (7%) than the ANZDATA Australian rate, and the withdrawal rate is 1% higher.
The percentage of permanent transfers to haemodialysis is 2% lower than ANZDATA, but the temporary transfer percentage is 3% higher.

## Workload

In 2007 the PD unit provided 156 training days for PD patients with training time varying from 4 - 29 days. There were 7276 occasions of service; these include nurse outpatients, doctor outpatients, home visits, patient/staff education and phone contact.




The CAPD clinic provides services to inpatient and outpatient peritoneal dialysis patients; dialysis and transplantation clinics, post operative Tenckhoff insertion inpatient follow-up, inpatient dialysis support, home visits, phone contact and dialysis training in conjunction with ongoing patient education.

There were 89 hospital admissions in 2007 compared to 63 in 2006 for peritoneal dialysis patients. The breakdown of these is as follows; 15 related to peritonitis (24 in 2006), 50 related to peritoneal dialysis catheter insertion, removal or repositioning (45 in 2006), 22 related to patients requiring hospital IPD (intermittent peritoneal dialysis) for fluid overload, post insertion and of those 3 were for under-dialysis (12 total IPD in 2006), and 2 kidney transplants.

## PD Dialysis Adequacy, Biochemical and Haematology targets

### Aim

To compare dialysis adequacy using haematological biochemical markers and Kt/V with previous audits conducted in April ’06 (40 patients), October ’06 (37 patients), April ’07 (40) and October ’07 (51). 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.

To ensure all patients have had a PET test performed to establish a baseline membrane transporter status.

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 during October - December 2007 for the current dialyzing PD patients and compared to previous audits.

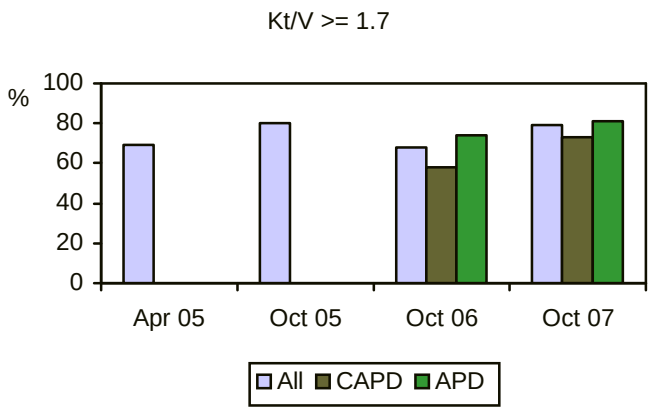
### Method

The CAPD clinic nurses and consultant renal physicians arrange the collection LFT, UEC, FBC, Iron studies, PTH, Mg, Ca, $PO_4$ and Lipids as per routine 6 monthly bloods for PD patients.

Kt/V testing was coordinated by the CAPD nurses as per protocol as was the PET testing.

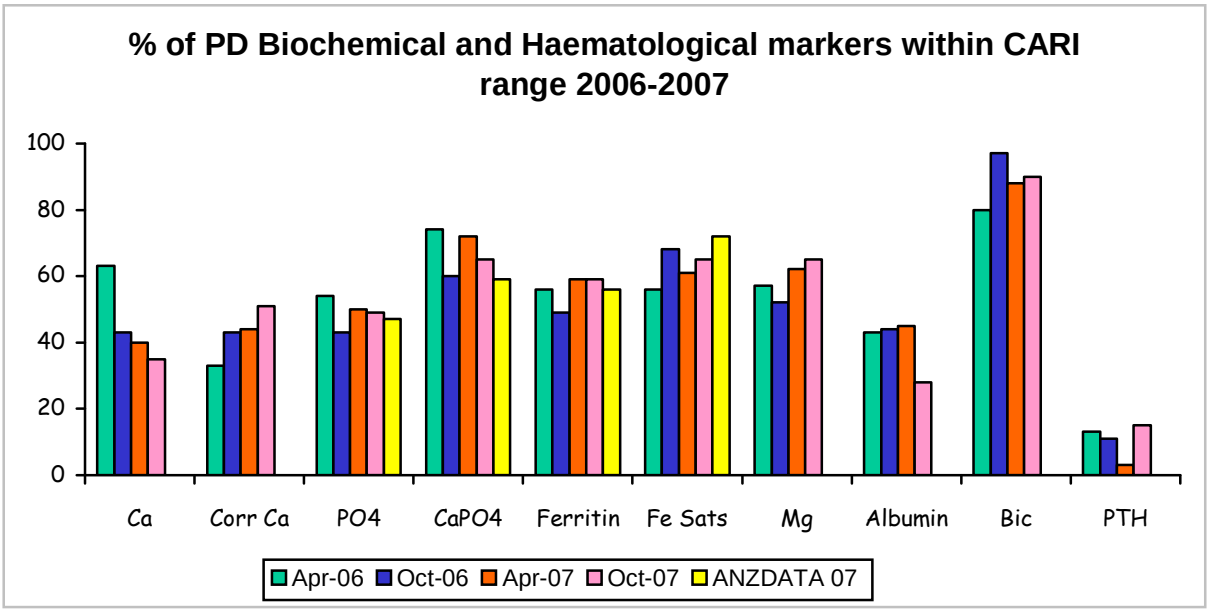
The renal CNC collates these results into spreadsheets using Microsoft Excel and SPSS v15 for statistical analysis. These results are compared to the previous year and measured against the benchmark set by the CARI guidelines. If any action is required, a meeting is organised with the peritoneal dialysis unit and actions are taken to resolve issues. A unit member will then be nominated to take responsibility for the action while the quality assurance nurse will follow up and report the results in 6 monthly intervals.

## Percentage of patients who achieved a Kt/V ≥ 1.7



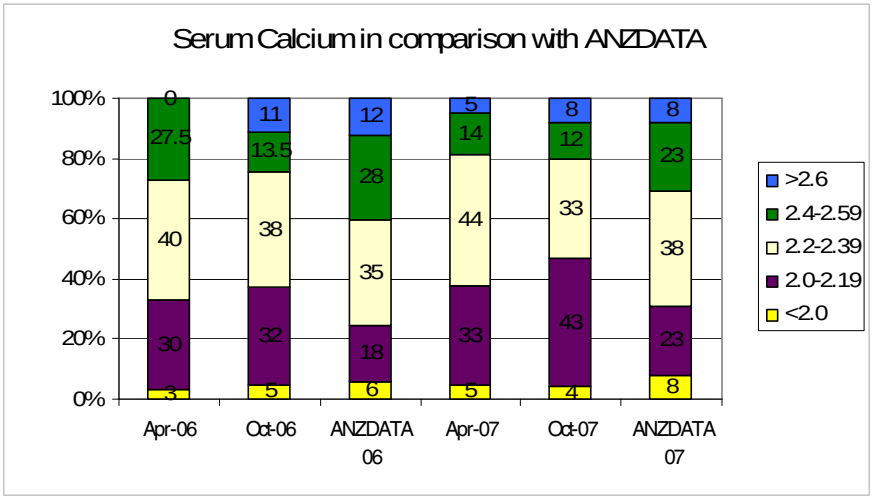

Statistics:

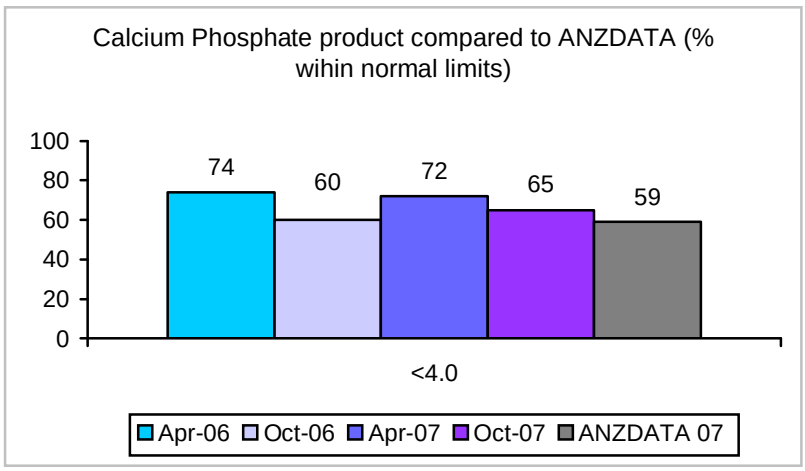
Oct 06 Mean: 2.14, SD .607
Oct 07 Mean: 2.13, SD .519

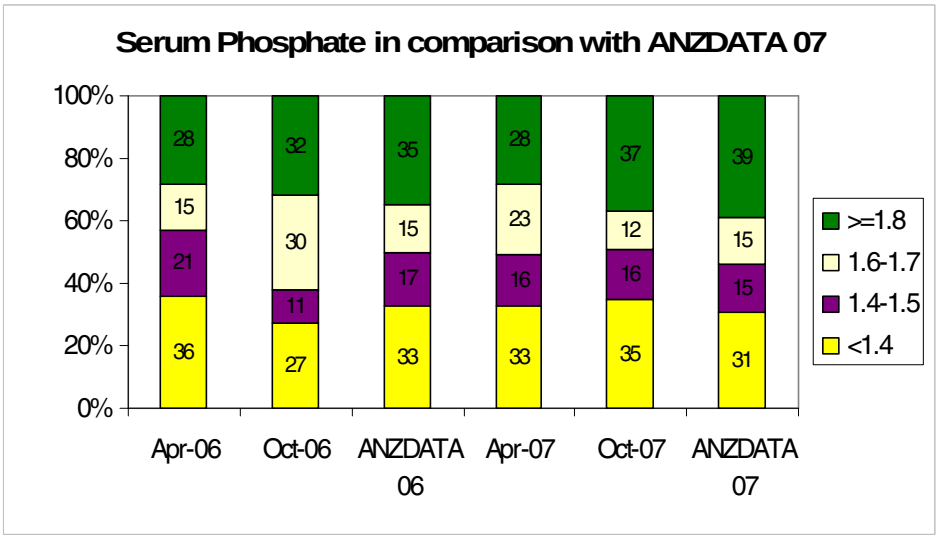



## Results: % of patients falling within the target range

| Parameter | Target | Apr 06 | Oct 06 | Apr 07 | Oct 07 | ANZDATA 07 |
|---|---|---|---|---|---|---|
| Ca | 2.25-2.58 mmol/L | 63 | 43 | 40 | 35 | - |
| Corr Ca | 2.1-2.4 mol/L | 33 | 43 | 44 | 51 | - |
| PO4 | 0.8-1.6 mmol/L | 54 | 43 | 50 | 49 | 47 |
| $CaPO_4$ | <4.0 mmol/L | 74 | 60 | 72 | 65 | 59 |
| Ferritin | 200-800 ug/L | 56 | 49 | 59 | 59 | 56 |
| Fe Sats | 20-50% | 56 | 68 | 61 | 65 | 72 |
| Mg | 0.74-1.03 mmol/L | 57 | 52 | 62 | 65 | - |
| Albumin | 33-48 g/L | 43 | 44 | 45 | 28 | - |
| Bic | 20-30 mmol/L | 80 | 97 | 88 | 90 | - |
| PTH | 10-15 nmol/L | 13 | 11 | 3 | 15 | - |
| KT/V | ≥ 1.7 | - | 69 | - | 81 | - |
| CCL | > 50L | - | 77 | - | 84 | - |





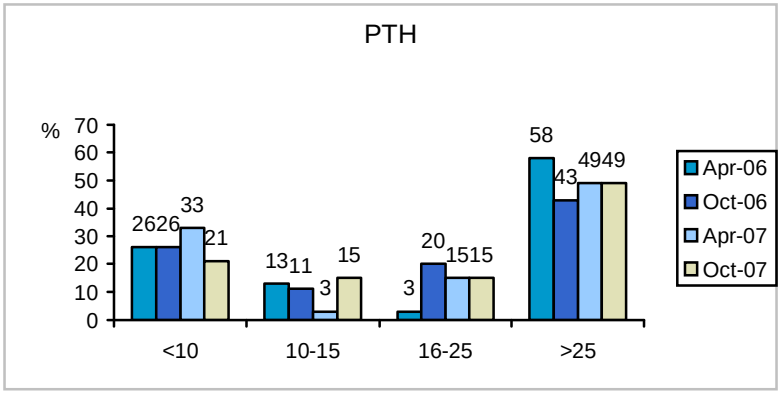




**Calcium and Phosphate**

- Calcium results show a greater percent of patients with a calcium between 2.2 and 2.6 in the ANZDATA groups compared to St George. The sample mean in October and April ’07 was 2.27.
- Phosphate results are comparable to ANZDATA. The sample mean in Oct ’07 was 1.69 compared to 1.55 in April ’07.

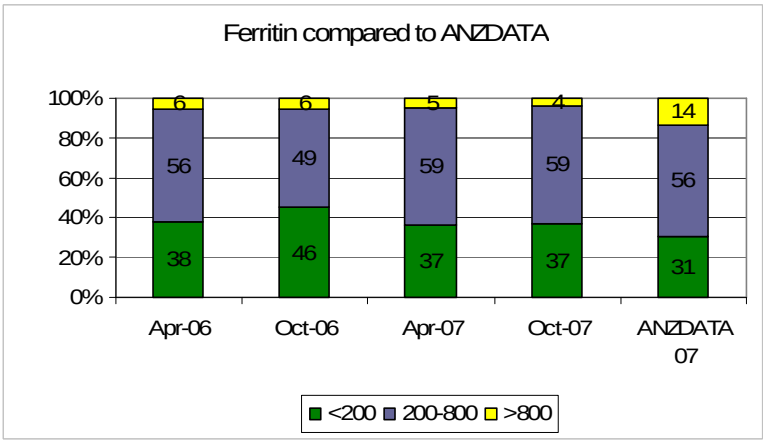
**PTH**

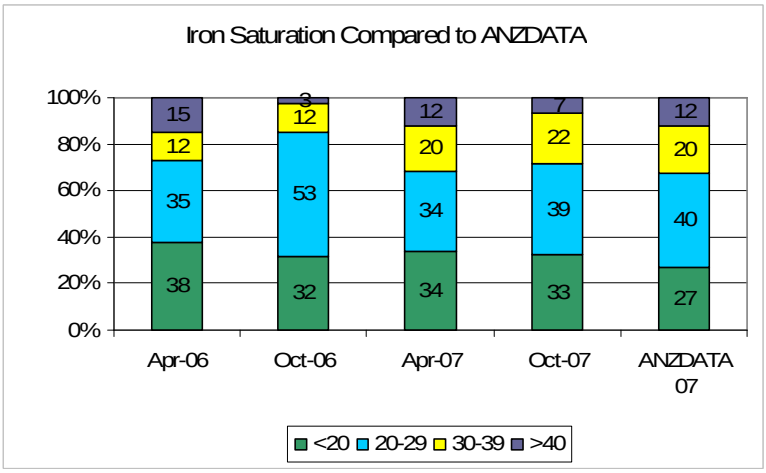
- In October 2007, 17% of peritoneal dialysis patients had a PTH within the recommended limits set by CARI of 10-15nmol/L, 19% had a level less than 10 while 15% were between 16-25 and 49% were >25.
- The maximum recorded PTH in October ’07 was 158, the sample mean was 37.96 (median 23.2) nmol/L.
- These are improvements from the results seen in 2006 with a greater overall percentage of patients with a PTH within the normal limits.




**Iron**

- The CARI guidelines recommend the administration of supplementary Iron to prevent iron deficiency and to achieve and maintain an Hb concentration of 110 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.
- There has been no significant improvement in the Ferritin and Iron Saturation results. Results are similar to those benchmarked in ANZDATA. Iron saturations below 20% show room for improvement. Nurse initiated iron has commenced with earnest in 2008 and we will measure any changes in the patient iron results throughout the year.



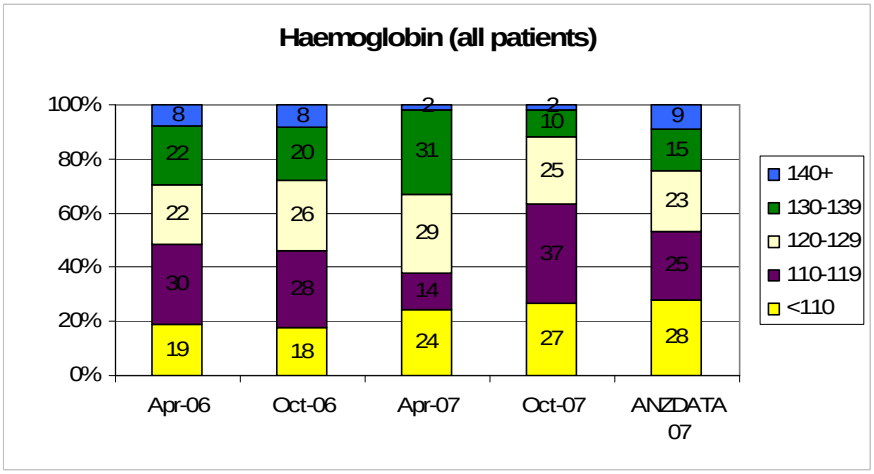



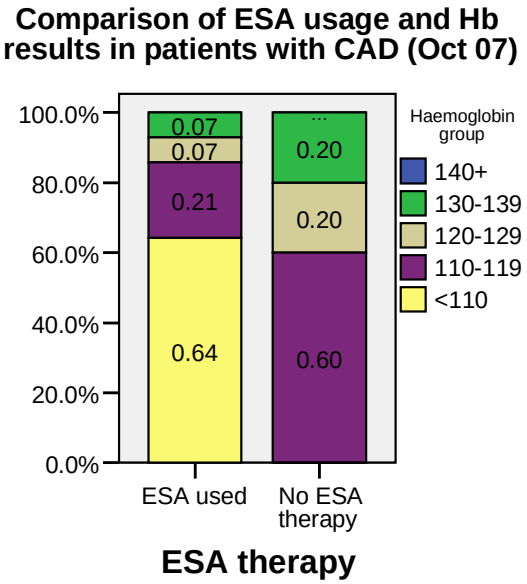
## Haemoglobin

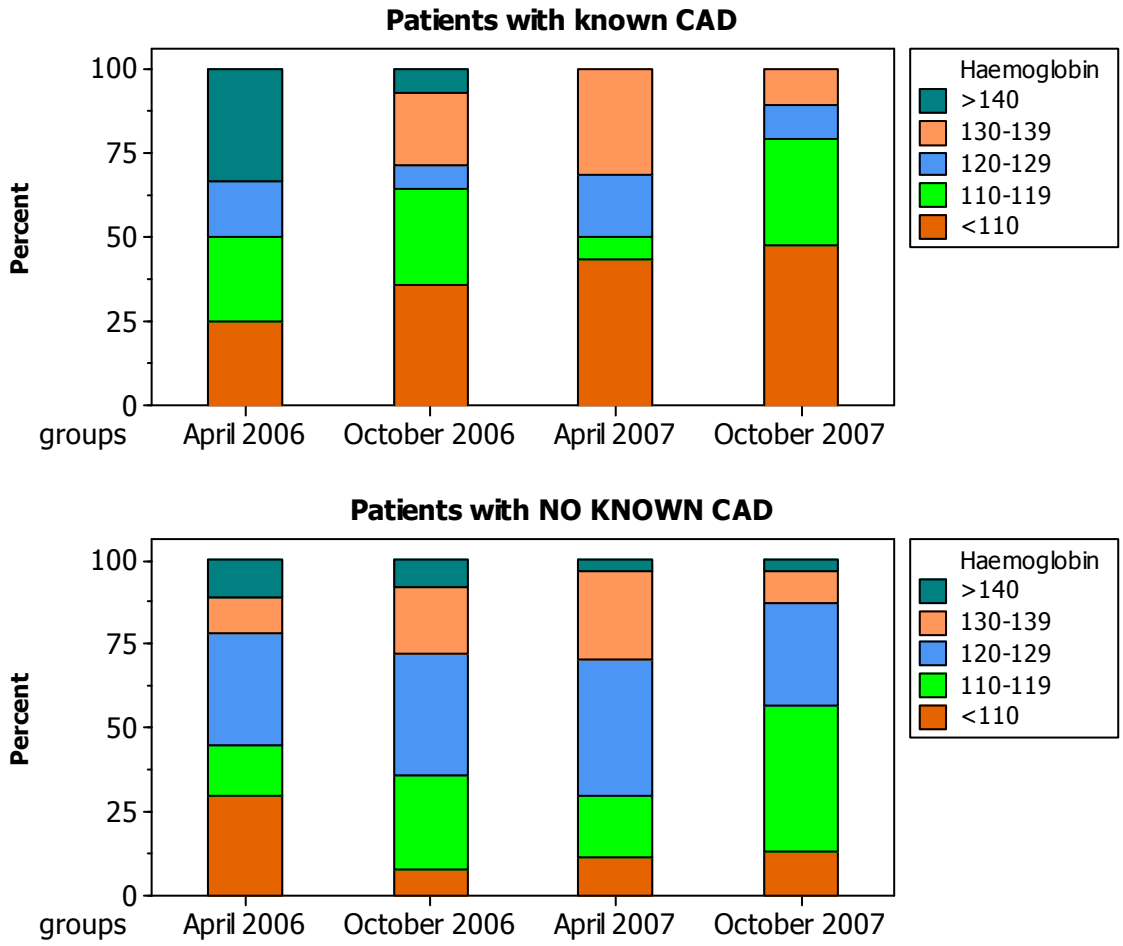
Haemoglobin (Hb) has been examined using cardiovascular disease (CAD) as a determining factor. Erythropoiesis-stimulating agent (ESA) is analysed amongst the CAD patients due to evidence of increased risk of adverse events when the Hb is greater than 130 g/L (NKF-KDOQI 2007), and this group being of greater risk.

- The October 2007 PD population had a greater percent of patients within the Hb normal range of 110-120 g/L. Compared to ANZDATA, less patients are in the high range (>130 g/L).

- CAD patients on ESA have a greater percent of Hb's <110 g/L while those not on ESA have no patients <110 g/L, but a greater percent had and Hb >120 g/L (nobody was >140 g/L).



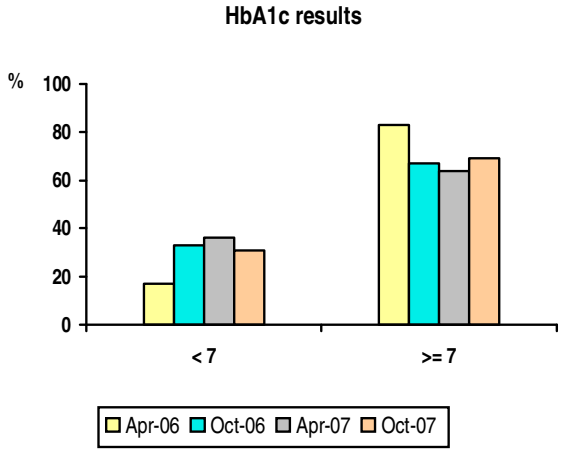


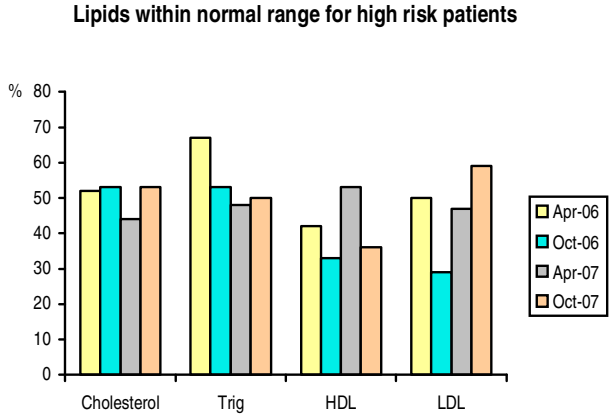

- In October 2007, Hb in patients with known CAD shows an increasing percent of patients <110 g/L, but an improvement in the percent of patients within the normal range of 110-120 g/L compared to April 07 (not statistically significant), and a reduced percent of patients with an Hb >130 g/L.

- Hb in patients with no known CAD again shows an improvement, as with the previous group, with a greater percent of patients with an Hb 110-120 g/L compared to April 2007. There is an equal percent of patients with an Hb >140 g/L (n=1) in April and October 2007, with more patients having higher Hb's in 2006 (n=3 and n=2).

## HbA1c (Glycosylated Haemoglobin)

Measuring the HbA1c gives an average glucose level of the past 8-12 weeks. There has not been an improvement in the percentage of patients with an HbA1c result of <7% suggesting better sugar control is needed.




## Lipids

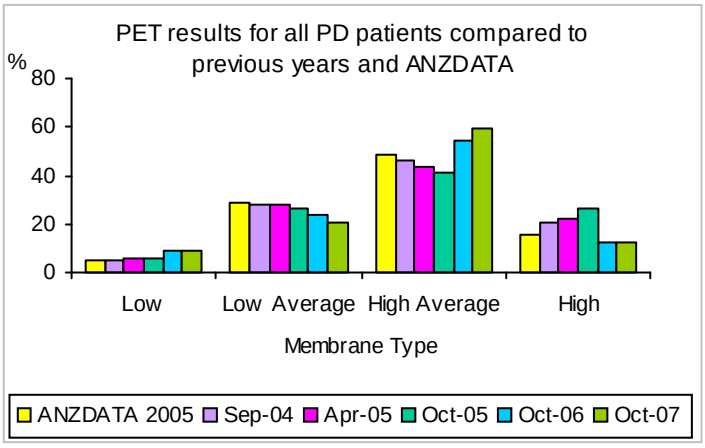
Lipids are collected for high-risk patients (having or suspected of having: diabetes, coronary artery disease, cerebrovascular disease, peripheral vascular disease), 63% of PD patients are classified as high-risk. There is an improvement in LDL, but no improvement in cholesterol, triglycerides or HDL. Approximately only 50-60% of patients are meeting the targets indicating improvements are needed.

## PET (Peritoneal Equilibrium Test) Results

PET measures the peritoneal membrane type, which is important to know when individualizing patient dialysis prescriptions. Each membrane type has different transport characteristics, which determines what PD prescription/modality (APD or CAPD) would provide the patient with the best outcomes.

The first PET is performed approximately 6 weeks after initiating peritoneal dialysis.

The St George Hospital peritoneal dialysis unit performs one PET on each peritoneal dialysis patient after dialysis treatment commences and further tests are undertaken if a change in transport status is suspected. CARI recommends an annual PET if there is clinical evidence of a change in transport status (eg clinically significant decrease in ultrafiltration or unexplained fluid overload). PETs for all patients are under review in 2008.



## 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 were collected using the Poet 2.1 database and a review of the PD record books. These statistics are collected retrospectively on a yearly basis and compared to the previous year.

### Method

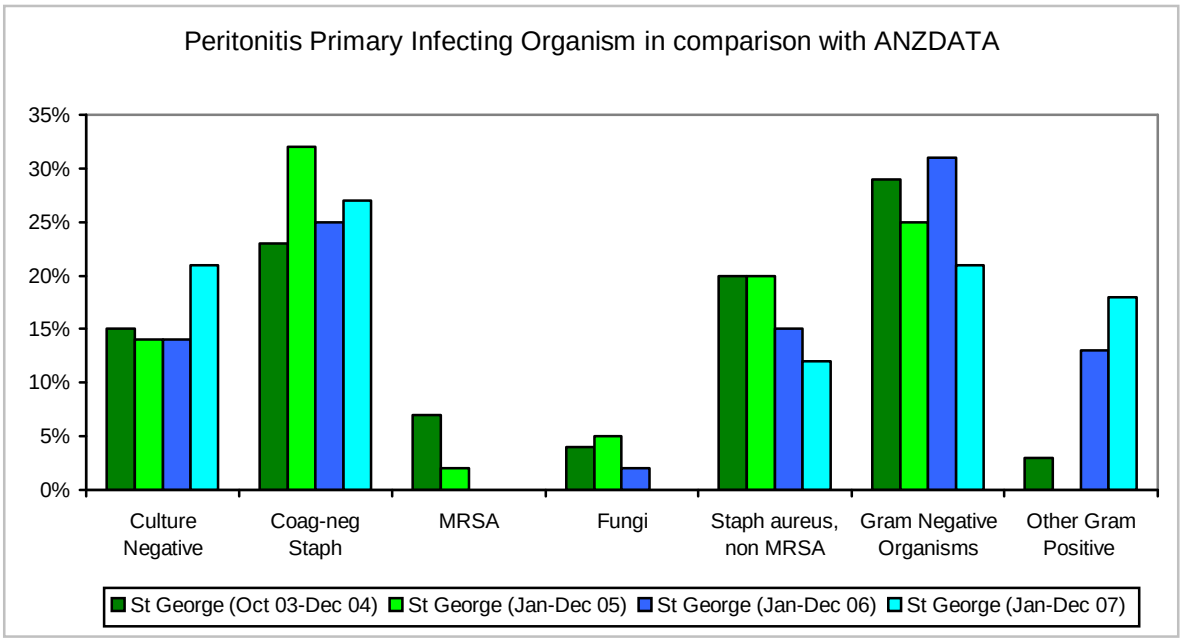
1. Review PD record books for episodes of peritonitis and exit site infections.
2. Review the Poet 2.1 database for episodes.
3. View patient records for admission and treatment information.
4. Peritonitis Episode Forms (ANZDATA) are used to collect information regarding every peritonitis event, to accurately track episodes and treatments. This data is then analyzed using the statistical program SPSS vs15.
5. Recurrent infections and infections that occurred while not on peritoneal dialysis are not included. Recurrent peritonitis is defined as 'within four weeks of the last antibiotic dose (or within five weeks if intermittent Vancomycin used) for the same organism' ANZDATA (2006).

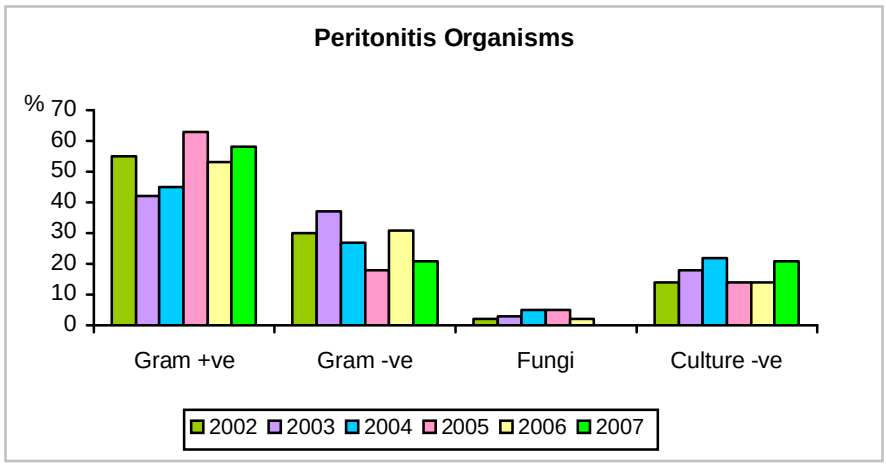
### Outcomes

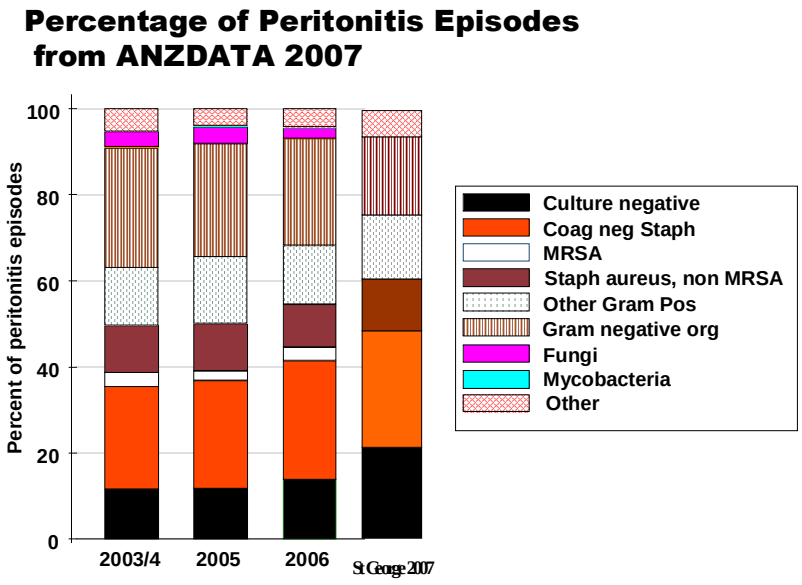
- The rates of infections from 1998 to 2007 show progressive improvement.
- Causative organisms for peritonitis infections are comparable to ANZDATA.

| | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** |
|---|---|---|---|---|---|---|---|---|---|---|
| Total patients | 72 | 71 | 62 | 79 | 97 | 92 | 74 | 67 | 65 | 74 |
| Peritonitis episodes | 118 | 81 | 69 | 45 | 51 | 62 | 42 | 34 | 40 | 28 |
| Patients with at least 1 episode of peritonitis | N=47<br>65% | N=42<br>59% | N=26<br>42% | N=26<br>33% | N=37<br>38% | N=38<br>41% | N=32<br>43% | N=31<br>46% | N=28<br>40% | N=21<br>28% |
| Patients with at least 1 episode of Exit site infection | N=39<br>54% | N=43<br>60% | N=33<br>53% | N=21<br>27% | N=32<br>33% | N=38<br>41% | N=14<br>19% | N=16<br>24% | N=14<br>22% | N=12<br>16% |

## Peritonitis Causative Organisms



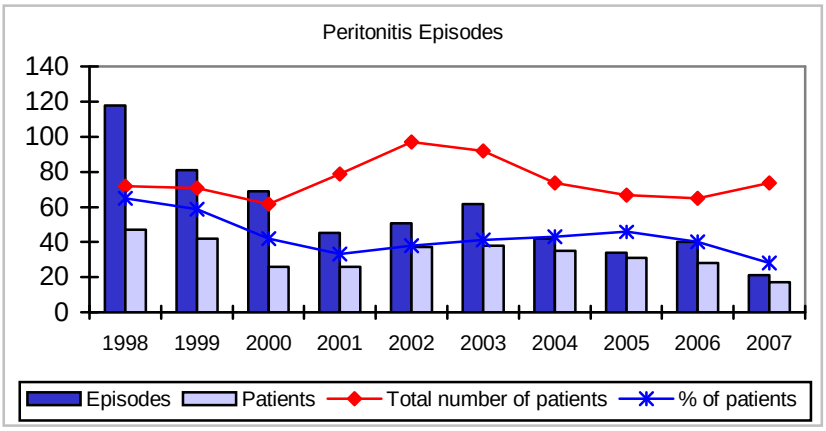

Compared to ANZDATA our peritonitis organisms show more culture negative (likely due to patients already having antibiotic treatment for other reasons. One patient was a prolonged admission for non-dialysis reasons). There are less gram-negative organisms and similar rates for all other organisms.

## Change of treatment as a result of peritonitis

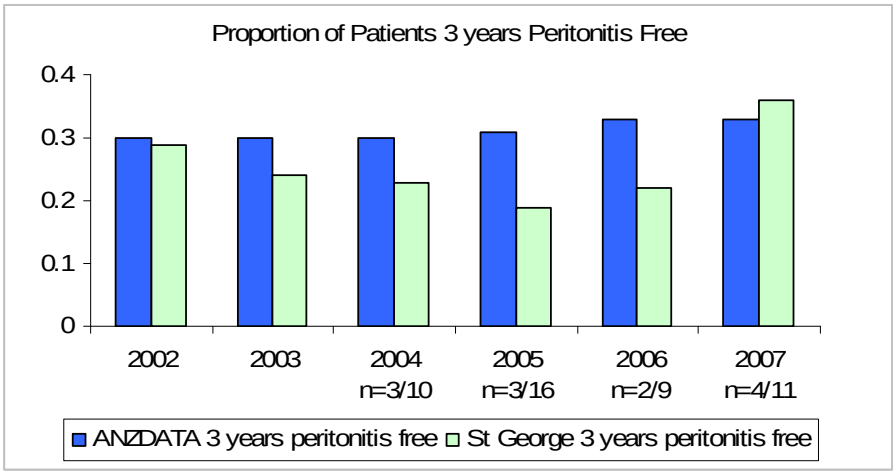
The peritonitis data collected throughout 2007 was analysed through the SPSS vs15 statistical program to determine the rate of transfer to haemodialysis as a direct result of peritonitis. The results are listed in the following table:

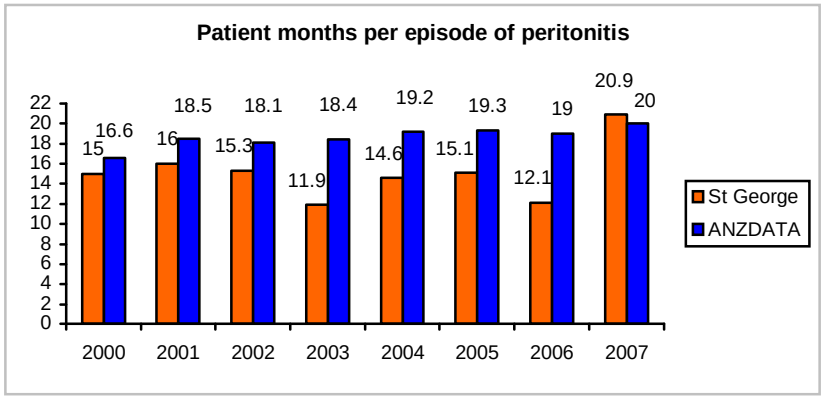
| Change in treatment (%) | 2005 | 2006 | 2007 |
|---|---|---|---|
| Interim Haemodialysis | 9 | 9 | 10 |
| Permanent Haemodialysis | 11 | 13 | 13 |
| Catheter removed | 20 | 22 | 20 |

## Peritonitis episodes and rates comparing previous years and ANZDATA




- The number of episodes of peritonitis and the number of patients who had peritonitis over the years 1998 – 2007 shows progressive improvement. There are significantly less infections since the commencement of data collection in 1998. This can be attributed to better connection systems and patient training.
- The proportion of peritoneal dialysis patients who are 3 years peritonitis free has improved with 36% of patients who have been on dialysis >3 years peritonitis free. This includes one patient who had an early catheter replacement due to peritonitis and has been peritonitis free > 3 years since.






- Patient months per episode of peritonitis compared to ANZDATA Australian results show an improvement in 2007 to slightly better the ANZDATA result meaning there is a greater length of time to a peritonitis episode. This result may possibly be due to our higher rate of APD compared to the rest of the country.

**Comments**

- ANZDATA results are the benchmark used for comparison with St George results. The ANZDATA peritonitis report covers all age ranges and we are unable to present these results without the paediatric data included, unlike other areas of the report where this data can be excluded.
- The peritonitis incidence per patient months has improved over 2007 to 1/20.9 months. This betters the benchmark set by the Australian ANZDATA results.
- The percentage of patient's peritonitis free at 3 years has improved to 36%.
- Three patients had two organisms isolated from the dialysate. Of these, none changed to haemodialysis as a result, but one withdrew treatment.
- ANZDATA (2007, p. 6.14) reports the primary cause of technique failure (ceasing peritoneal dialysis) as 'social reasons' (36%) and infections as the second most common cause (29%).

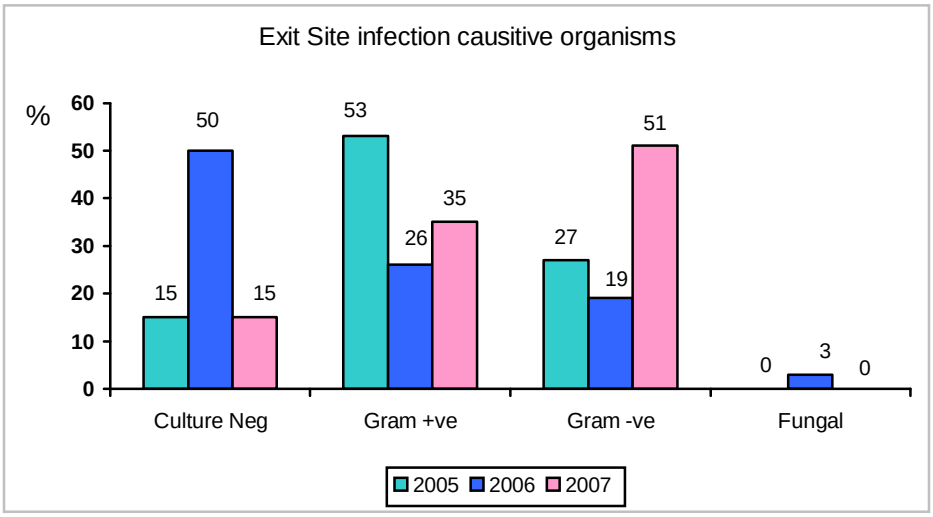
**Technique failure**

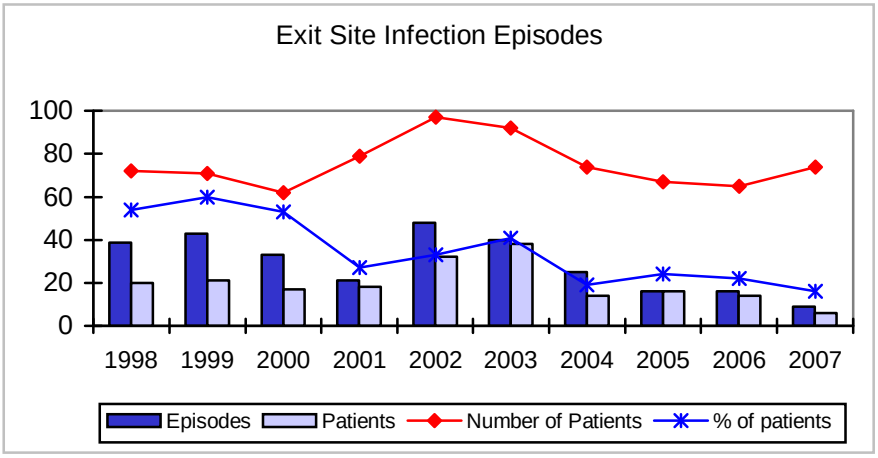
- When a patient changes dialysis modality from peritoneal dialysis to haemodialysis.
- The St George primary reason for technique failure is 'technical' with 50% changing to haemodialysis either permanently or temporarily due to dialysate leaks, or surgery (primarily hernia). Infective reasons accounted for 36%, dialysis failure 7% (inadequate dialysis) and social only accounted for 7%.
- The primary reason for failure in ANZDATA is 'social'. St George has a considerably lower rate of social reasons for change of modality.

| ***Primary reason for technique failure*** | ***St George 2007*** | ***ANZDATA 2007*** |
|---|---|---|
| Infective | 36% | 29% |
| Dialysis Failure (inadequate dialysis) | 7% | 21% |
| Technical (leaks, surgery, mechanical) | 50% | 15% |
| Social (patient choice) | 7% | 36% |

## Exit Site Infections

The following graphs represent the exit site swab results from 2005 to 2007 and the numbers of patients and episodes of exit site infection. Exit site infections have reduced significantly since data collection began in 1998, there are significantly less repeat infections and a continual decline in the percent of patients who have infections.




- ESI episode in 2007 is 1/36.5 patient months compared to 1/30.2 patient months in 2006.
- 83.8% of the total numbers of peritoneal dialysis patients were free from exit site infection in 2007 compared to 81.5% in 2006.

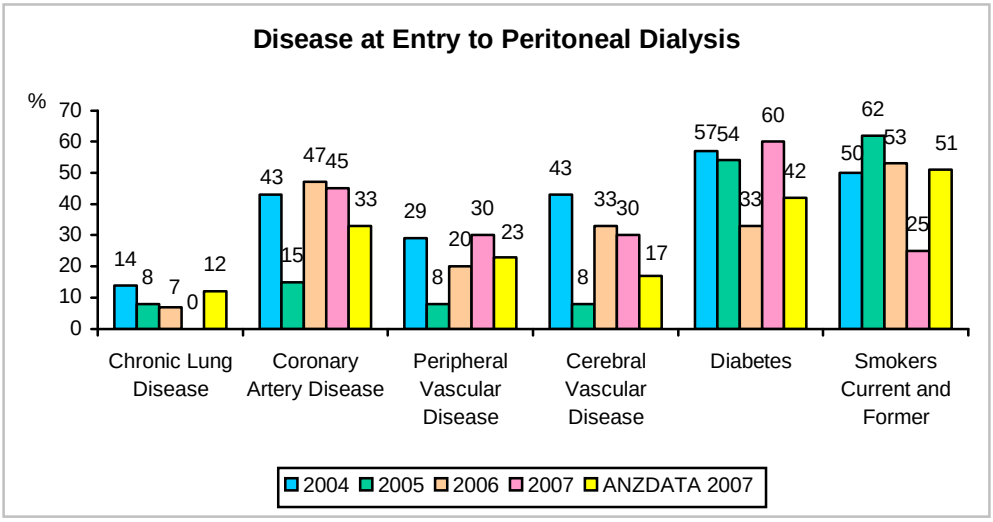
**Comments:**
ANZDATA does not collect data on Exit Site Infections; therefore there is no Australian benchmark data with which to compare.

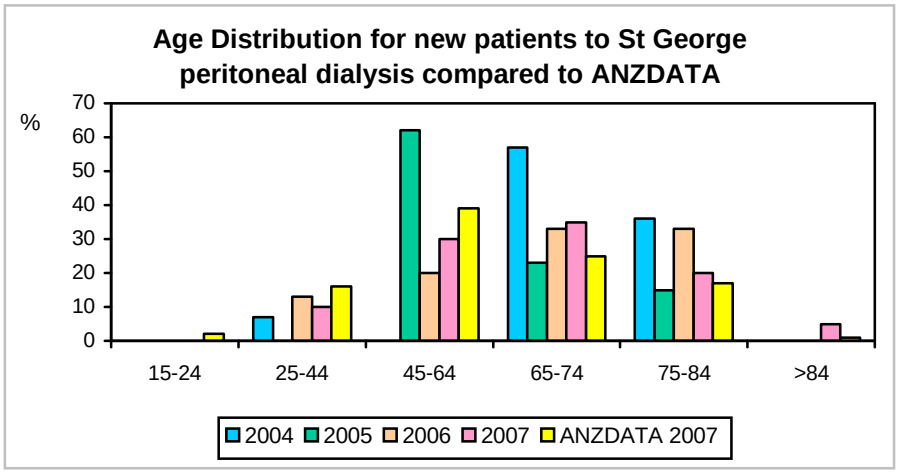
The St George Peritoneal Dialysis Unit uses the Baxter POET computer software to record all swabs taken for analysis from each and every PD patient. The results of all of these swabs can then be graphed using this software. The drawback of this system is the inability to filter this data for actual exit site infections and routine swabs (including post operative).

## Acceptance onto Peritoneal Dialysis

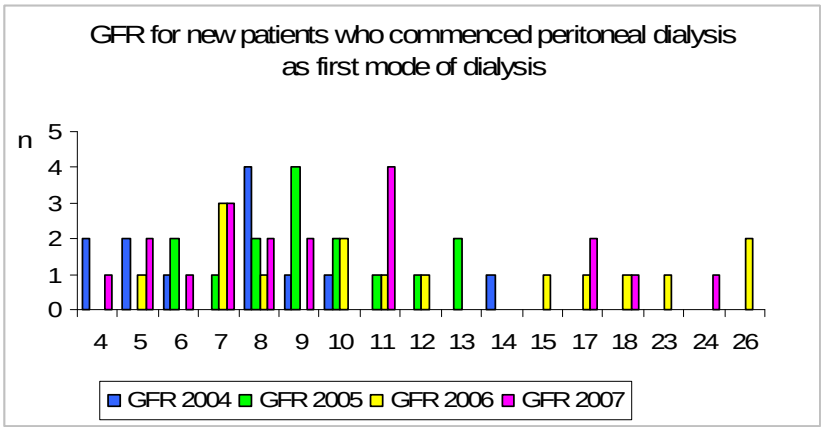
20 patients are included in this data. Excluded are the patients who commenced haemodialysis prior to transfer to peritoneal dialysis.

- 2007 had four late referrals to peritoneal dialysis.
- Mean age at commencement of PD in 2007 was 67 years.




In 2007 we accepted a fairly even distribution of patients from most age groups; this corresponds to ANZDATA. There has been a small increase in the 45-74 year age groups (n=13), an acceptance of one >84 year aged patient and a decrease in the 25-44 (n=2) and 75-84 (n=4) year age groups. ANZDATA 2007 report increases in only two age groups, the 15-24 and >84 years.




In 2007 there were a greater number of patients who commenced dialysis with an eGFR <12.
The calculations are prepared using available patient details at commencement of dialysis. The data used for this calculation is height, weight, age, sex and creatinine. This data is then calculated using a GFR calculator.

## Breakdown of baseline Characteristics of new peritoneal dialysis patients

| | | St George Total 2006 (n=20*) | ANZDATA 2007 |
|---|---|---|---|
| Age | (Average age in years) | 67 | 61[†] |
| Gender | Male | 50% | 53% |
| | Female | 50% | 47% |
| Late Referral | (< 3 months before first treatment) | 20% | 23% |
| Co-morbidities | Smoking (Current and former) | 25% | 51% |
| | Chronic Lung Disease (yes and suspected) | 0% | 12% |
| | Cerebrovascular Disease | 30% | 17% |
| | Coronary Artery Disease | 45% | 33% |
| | Peripheral Vascular Disease | 30% | 23% |
| | Diabetes | 60% | 42% |

*Excludes patients who had haemodialysis prior to peritoneal dialysis. [†] Total dialysis population (Hd + PD)

| St George Hospital new patients* | | 2006 | 2007 |
|---|---|---|---|
| Body Mass Index | <20 | 0% | 16% |
| (kg/m) | 20-24.9 | 33% | 26% |
| | 25-30 | 47% | 37% |
| | >30 | 7% | 21% |
| Racial Origin | Caucasoid | 93% | 60% |
| | Aboriginal/TSI | 0% | 0% |
| | Maori/Pac Islander | 7% | 5% |
| | Chinese | 0% | 15% |
| | Indonesian | 0% | 5% |
| | Vietnamese | 0% | 5% |
| | Other | 0% | 10% |

*Higher BMI is associated with higher rates of technique failure and death in Australia and New Zealand. (ANZDATA Registry 2004 Report: Pg 60)*
*BMI <20 indicates underweight, 20-25 normal, 26-30 overweight and >30 is obese.*

New patients show a slight increase in average age, up 2 years since 2006. There is an increase the numbers of patients from non-English speaking backgrounds and patients are heavier with more pre-existing co-morbidities. These factors indicate patients are becoming more complex; this has implications in training and patient outcomes such as hospital admissions and patient survival, especially in the case of diabetes and cerebrovascular disease.

**Identified strengths and weaknesses**

Iron management has been a weakness over many years due to the reliance on patients to make supplementary visits to the hospital for iron infusions (first dose requires a full day admission). Nurse initiated iron commences in 2008 and requires the staff to contact patients and organise admissions to ambulatory care, hopefully ensuring all patients maintain better irons and subsequently better Hb maintenance and reduced ESA dosage, but there is no guarantee of patient attendance for iron infusions. Educating new patients pre-dialysis or during dialysis training may improve patient attendance for iron infusions.

The higher rate of APD in the St George dialysis unit is a strength as it appears to be an influence in reducing episodes of peritonitis, although, the percent of patients changing treatment to haemodialysis as a result of an episode of peritonitis remains unchanged.

The percent of patients transferring to haemodialysis through technical failure (leaks, surgery and mechanical) is a weakness in 2007 which can be accounted for primarily through more than expected hernia repairs.

The rate of failing PD due to social reasons is 29% lower than the rate reported by ANZDATA indicating our patients are suitable for the program and are able to manage their chronic disease effectively.

Phosphate control has room for improvement; 49% of phosphates' in October '07 were greater than 1.6 mmol/L. These figures indicate poor phosphate control which is highlighted in the haemodialysis report where poor patient understanding is highlighted as a reason. Continuing education is important to ensure patients take medications correctly and do not get confused with conflicting information; this is covered by the dietician, but it is important other staff convey the same information.

## Predialysis Clinic Report

### Aim

To provide data to the department showing Predialysis Clinic (formerly the CKD Clinic) attendances and outcomes compared to past statistics.
To ensure all department staff are aware of the clinic and its importance in the decision making processes of patients with ESRF and their families.

### Process

The Predialysis clinic is held on 4 west on a Wednesday morning. The clinic is coordinated by the Renal Clinical Nurse Consultant (CNC), Shelley Tranter. All new patients are provided with dialysis options education and pharmacy, social work and nutritional assessment. Patients return to the clinic for follow up as required. Patients requiring review of vascular access are also seen in the Predialysis Clinic by the Vascular Access Nurse.

Once a patient is referred to the Predialysis Clinic they are tracked on a database which is updated as new information e.g. doctors letters or blood results are available. The database is found on RISC doc and can be accessed by renal staff. Patients are flagged at 400 creatinine and GFR 15 and this alerts the Vascular Access Nurse to check for vascular referral in patients on the haemodialysis pathway.

The Predialysis Clinic presentations and outcomes are benchmarked against previous clinic data dating back to April 2002.

### 2007 data

In 2007 there were 38 new attendees to the clinic: 20 males and 17 females (see table 1 and 2 for yearly comparisons). More males than females have attended clinic since the commencement in 2002, the reasons for this are unknown. The mean age of new patients for 2007 is 65.6 years (see figure 3).
Attendances by physician were; Prof Brown 11, Dr Chan 2, Prof Kelly 8, Dr Mangos 3, Dr Luxton 3 and Dr Trew 11 (see figure 4).
Follow up appointments are important for supporting patients at different stages of their trajectory to dialysis. There were only 8 return visits to the clinic for 2007.

Of the 38 new patients seen in 2007; only one patient has actively sought a non-dialysis pathway, 9 commenced peritoneal dialysis, one commenced hospital haemodialysis and one is on home haemodialysis. The remaining patients remain active on the Predialysis Clinic pathway.

Of the 29 ESRF patients who commenced haemodialysis in 2007, 12 had attended the clinic pre dialysis. 14 of the 20 patients who started peritoneal dialysis for the first time had been to the clinic for education and assessment.

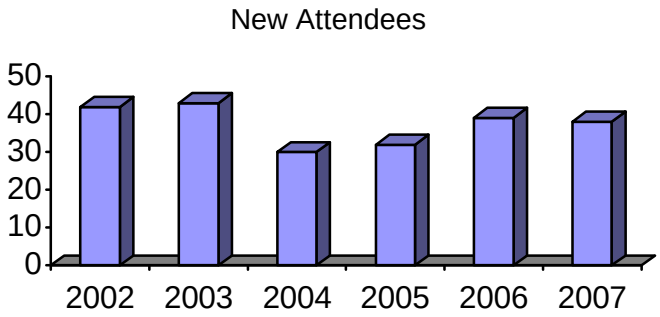



Figure 1

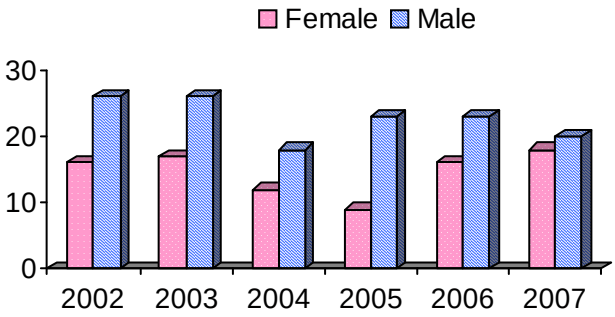



Figure 2

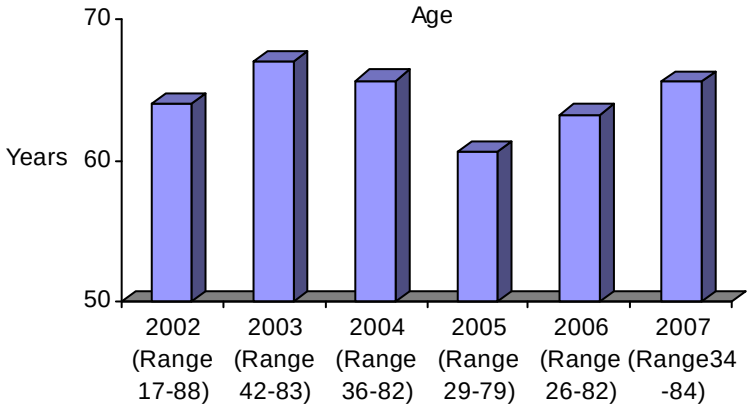



Figure 3

Figure 1 represents the number of new attendees each year. A total of 224 patients have been seen since the commencement of clinic in April 2002.

Figure 2 compares the number of male and female patients attending the clinic.

Figure 3: Age of the CKD clientele since its introduction in 2002. The range for 2007 is from 34-84years of age.

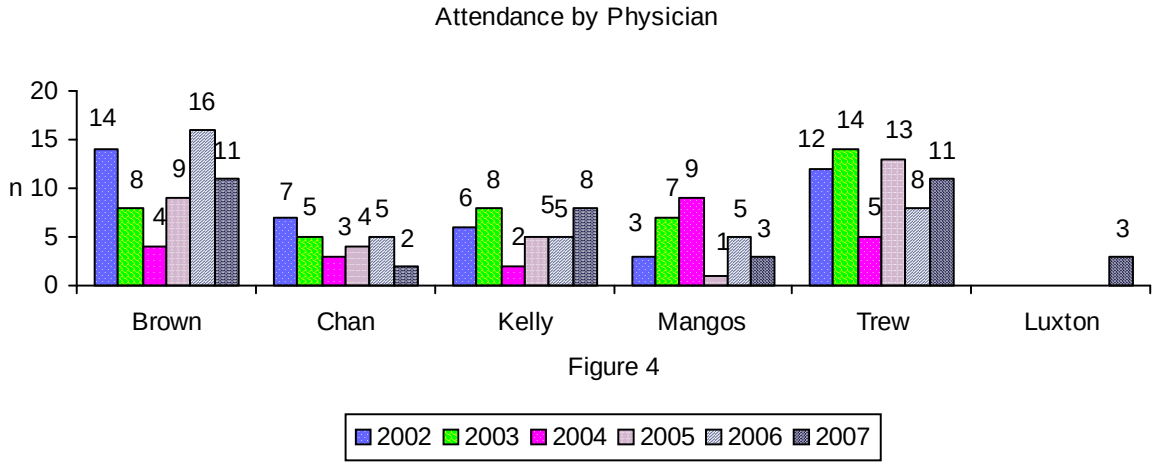



Figure 4

Figure 4
Attendance at clinic by physician

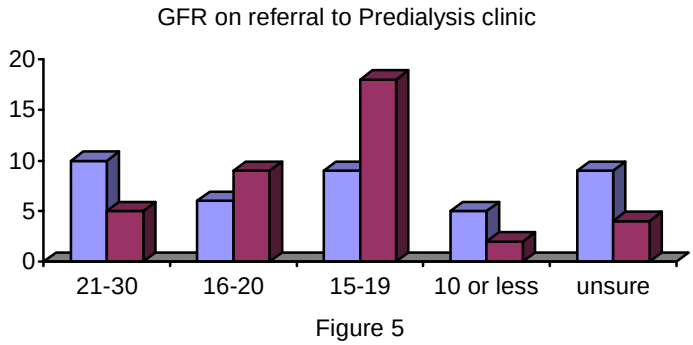



Figure 5

Figure 5
The GFR on referral to the clinic for the 38 new patients in 2007.

**Importance of the outcomes to the unit**

The guideline for referral to the Pre dialysis Clinic is creatinine greater than 300 and GFR less than 25. Evidence is available regarding late referral of dialysis patients, this evidence shows that those who are referred late (<3 months before dialysis) have a much greater chance of ending up on hospital haemodialysis and having a central venous line[1]. This group of patients also have a higher morbidity and mortality rate.

**Actions/ recommendations/ responsibilities**

1. The Predialysis Clinic is an important step on the pre dialysis, or the 'not for dialysis' pathway. The 'Nephrology 2005; 10,S46-S60' journal has pre dialysis suggestions based on level III and IV evidence. The Nephrology Journal 'Acceptance onto Dialysis Guidelines' S46-S48, reinforces the benefits of what we already offer to our Predialysis patients through the clinic. The Predialysis

[1] ANZDATA 27th annual report

Clinic presently offers education on the treatment choices available (dialysis types and non dialysis option), pre-dialysis education and contact with multidisciplinary team members for diet education and social work. Clients are referred to the clinic by the nephrologists, but the registrars should also refer any CKD client whom they feel may benefit from the service.

2. During 2007 the hospital has experienced difficulties with social work recruitment and the renal social worker was required to work in other areas of the hospital. This left the clinic without the support of a social worker for long periods. In 2008 the social worker was returned to duties within the renal department allowing for valuable support for the clinic.

3. Patients are often not seen at the clinic after the initial visit. The second visit gives the patients an opportunity to ask questions and further discuss options. It is the responsibility of all of the renal doctors to refer the patients for follow-up visits. Presenting this data to the renal meetings is an avenue to make staff aware of the existence of the service and how important it is in assisting patients in making important decisions.

4. In 2008 the dialysis secretary will be given a list of the patients who have attended predialysis clinic and the patients will be contacted to arrange 12 monthly follow up visits (minimum).

**Review**

The Predialysis Clinic data will be reviewed again in January 2009 in preparation for the annual report. The next presentation of this topic to the department will be late 2008.

# RENAL NUTRITION

Ongoing QI activities performed by the renal dieticians in year 2007 included:

A. Dialysis nutrition assessment and dialysis adequacy
B. Pre-dialysis clinic evaluation – Nutrition component
C. Phosphate management in haemodialysis patients

The aims of these QI activities are to improve patient outcomes and to formulate management strategies.

## A Dialysis nutrition assessment and dialysis adequacy

Dialysis patients of SGH receive regular nutritional assessment by dietitians using criteria as recommended by the CARI and DOQI guidelines. Nutrition intervention and monitoring are to be provided once suboptimal control and / or undesirable parameters are identified. These activities were conducted as per schedule by dietitians in April and October 2007, at the time of the unit's dialysis adequacy studies/audit of biochemical and haematological targets. All patients received intervention. Remark: Due to the time constraint, a more structured evaluation and reporting of outcomes remain to be established.

## B Pre-dialysis assessment clinic:

**Background:** The establishment of a multidisciplinary pre-dialysis assessment clinic in 4/2002 provided dietitians the opportunity to assess patients' nutritional status pre dialysis (see previous reports) and provide appropriate intervention
**Aim:** Evaluation of pre-dialysis assessment clinic – nutrition component for the period of 4/2002 to 4/2008
**Method:** To describe demographic, clinical and nutritional characteristics of patients attended the pre- dialysis assessment clinic.
**Results:**

- 206 of the 211 patients were assessed by the dietitians
- Male: 60.2%; mean age 65.7±13.4 years
- Diabetes mellitus 33.7%
- Mean $GFR_{MDRD}$ 13.4 ± (4.5) ml/min
- Stage of CKD (%):
  - stage 3 (4.9%)
  - stage 4 (55.8%)
  - stage 5 (39.3%)
- Body Mass Index (BMI) and prevalence:
  - < 20kg/$m^2$ (underweight) 5.7%
  - > 30kg/$m^2$ (obese) 30.9 %
  - > 40kg/$m^2$ (extreme obesity) 3.3%
- Subjective Global Assessment (SGA):
  - 39.9% were classified as malnourished using the SGA rating (score B and C)
  - The prevalence of malnutrition increased with decrease in GFR
  - 45/143 (31.5%) of overweight patients (BMI > 25kg/$m^2$) were rated as malnourished

- 14.4% of patients reported > 5% unintentional weight loss 6 months prior to attending the clinic.
- 48% of patients experienced symptoms affecting dietary intake e.g. nausea and taste aversion

**Conclusions:** Patients attending the current pre-dialysis assessment clinic presented with parameters indicative of poor nutritional health.
**Plan:** To audit/ study the clinical outcomes of these patients and to formulate management strategies.

**C Phosphate management in haemodialysis patients:**

Remark: please refer to the full report previously submitted to the Nephrology Department titled: Assessment of phosphate management using a knowledge questionnaire in a sample of patients undergoing maintenance Haemodialysis - a pilot study on 3-10-2007.

**Background:** hyperphosphatemia and achieving optimal control remain the major challenges to our dialysis patients.
These require intricate controls of the 3 Ds – ***D***ialysis, ***D***rug and ***D***iet
**Aim:** To survey the dietary aspects of phosphate management in a sample of haemodialysis patients
**Methods:** a patient questionnaire and chart audit of clinical parameters
**Results (selected):**

- 44 of 140 (~31%) HD patients participated in the questionnaire. 41% (n=18) had serum phosphate ($PO_4$) levels above the k/DOQI recommendation of 1.78mmol/L
- 27% (n=23) identified ≥ 50% high $PO_4$ foods listed in the questionnaire correctly
- 100% of patients with high serum $PO_4$ levels identified their binders correctly.
- 55.5% (n=10) of those with high serum $PO_4$ took binders after a few mouthfuls of food. 44% did not take binders with meals
- 55.5% (n=10) of those with high serum $PO_4$ took binders with snacks
- 61% (n=11) of those with high serum $PO_4$ took binders when eating at haemodialysis.

In a separate audit of one shift of ~ 32 patients. ~ 50% took $PO_4$ binders with their meals during HD on the day
**Conclusion:** This pilot project outlined the need for the dietitians to re-evaluate current phosphate management strategies that include diet education, phosphate binders regimen for patients in the haemodialysis unit at the SGH
**Action:** to form a multidisciplinary working party to formulate integrated strategies in phosphate management. Remark: the working party has been formed in March 2008.

**Report by**: Maria Chan, Senior Renal Dietitian
**Acknowledgements:** Alex McClelland, Danielle Bear and Glen Pang

## References

ANZDATA 2005:
http://www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm#28th%20Report

ANZDATA 2006:
http://www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm#29th%20Report

ANZDATA 2007:
http://www.anzdata.org.au/anzdata/AnzdataReport/download.htm#30th%20Report

CARI 2006, The CARI Guidelines, *Nephrology* 11(s1), pp s1-s261.

Kelly, J., Stanley, M. and Harris, D. 2005, Predialysis education, *Nephrology* 10(s4), pp s46-s60.

NKF-KDOQI. 2006, KDOQI Clinical Practice Guideline and Clinical Practice Recommendations for Vascular Access, *American Journal of Kidney diseases*. downloaded on 15-5-2008 from URL:
http://www.kidney.org/professionals/KDOQI/guideline_upHD_PD_VA/index.htm

NKF-KDOQI. 2007, KDOQI Clinical Practice Guideline and Clinical Practice Recommendations for Anemia in Chronic Kidney Disease, 2007 Update of Hemoglobin Target, *American Journal of Kidney diseases*, 50(3), pp 477-530. downloaded on 15-5-2008 from URL:
http://www.kidney.org/professionals/kdoqi/guidelines_anemiaUP/index.htm

NSW Health 2007: cited 24-04-2008, available from URL:
http://www.health.nsw.gov.au/gmct/renal/pdf/nswrenalplan_jan2007_final.pdf

Papatheofanis F., McKenzie S., Mody S., Suruki R. & Piech C. (2007). Dosing patterns, hematologic outcomes and costs of erythropoietic agents in predialysis chronic kidney disease patients with anemia, *Current medical research and opinion*, 22 (5): 837-842.