The St George Hospital Renal Department Quality Indicators

2008 Annual Report

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Cover Photo: The Sutherland Satellite Dialysis Unit opened in March 2008 to provide haemodialysis treatments for patients who are well and independent in a relaxed and friendly environment. The Unit is a stand alone building located in the grounds of Sutherland Hospital.

Acknowledgements:
Contributions towards peritoneal dialysis data from Nancye Detmold and Claire Cuesta

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 regular 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.

5. Report and improve central venous catheter infection and complication rates.

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

7. Report characteristics of patients accepted onto dialysis and compare our dialysis population characteristics with data from the 31st Australia and New Zealand Dialysis and Transplantation Registry (ANZDATA) Report 2008.

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

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

Executive Summary

1. a) There have been improvements in Phosphate and Ferritin levels in 2008 with these results now surpassing the national benchmarks published in ANZDATA 2008. Dialysis adequacy in peritoneal dialysis shows 86% of patients have a Kt/V ≥1.6 (CARI guidelines target).

b) Overall Haemodialysis (HD) biochemical results are comparable with the 2008 ANZDATA report. Patients continue to dialyse adequately as 91% of HD patients achieve a Kt/V ≥ 1.2 and URR 90%.

2. a) The Sutherland satellite dialysis unit opened in March 2008. Initially 21 patients transferred from the incentre unit who mainly resided close to the unit. At 31st December 2008 34 patients were undergoing haemodialysis at this unit.

b) Using indicators from NSW Health we are achieving good results (compared to national ANZDATA figures) for number of patients on home hemodialysis, dialysis adequacy, dialysis time and peritoneal dialysis infection rates.

3. In 2008 Gambro maintained, monitored and sampled the dialysis water systems at both sites. The water audit shows that our results comply with the Association for the Advancement of Medical Instrumentation (AAMI) 2004 guidelines and European Best Practice Guidelines (EBPG) 2002 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 significantly in 2008.

b) The number of patients commencing haemodialysis with a functioning access was 29%, lower than the ANZDATA 2008 report for NSW (35%) and for national data (39%). This is partly explained by the fact that St George had a greater number of late referrals in 2008 (29%) compared to the national ANZDATA report (23%). However, new strategies will be developed to address this issue in 2009.

5. Blood stream infections amongst permanent vascular access in 2008 reduced from 2007 as a result of protocol and procedure changes. BSI in gortex grafts ranged from 2.17-6.21 in 2007 to 0.95-1.03 in 2008.

6. Rates of peritonitis and exit site infections have again improved with the peritonitis rate now surpassing the ANZDATA benchmark in two areas, months per patient episode and 3 years peritonitis free. The peritonitis rate for St George is 1/24.6 months compared to 1/19.4 for national ANZDATA figures, and 46% of patients who have been on PD more than 3 years are peritonitis free compared to 31% for ANZDATA. The exit site infection rate has improved from 1/36.5 months in 2007 to 1/48.1 months in 2008.

7. a) The peritoneal dialysis unit had a net gain of 6 patients over 2008 with a total of 85 patients being treated compared to 74 in 2007. The trend in peritoneal dialysis continues to show an increase in number of patients on Automated peritoneal dialysis (APD) (an increase of 11%), which is 3% lower than that

reported by ANZDATA 2008 (14% increase in APD numbers reported). As ANZDATA figures represent data from 2007, this trend is similar to the large increase in APD numbers over 2007 in St George (18%). This reflects our Unit's desire to increase home peritoneal dialysis through a 'user friendly' approach such as APD.

b) St George shows an increase in the percent of 75-84 year olds commencing peritoneal dialysis as their first mode of dialysis which is similar to 2006 and 2004, but is opposite to the ANZDATA 2008 trend which reports a decrease in this age group. The percent of 65-74 year olds has fallen compared to the previous two years which is consistent with a fall shown in the overall ANZDATA 2008 age results. New patients have continued to get heavier, but co-morbidities have reduced compared to previous years and those reported in ANZDATA.

c) The 4 West haemodialysis unit showed a 5% activity growth compared to 6% growth in 2007. As of 31st December 2008, there were 109 incentre haemodialysis patents, 34 satellite patients and 48 patients undergoing haemodialysis at home. The number of new patients commencing haemodialysis was higher in 2008 (38) than 2007 (27).

d) The average age of patients commencing haemodialysis at St George was 64yr, median age 65yr. The ANZDATA 2008 report indicates the average age for all new patients was 60years and the median age was 63years. Fifty three percent of new patients who commenced haemodialysis at St George are 65yr or older which is similar to the ANZDATA 2008 report and almost 10% lower than 2007 patients. In 2008 there was an increase in new patients younger than 65years and older than 85years.

8. Dialysis patients of SGH receive regular nutritional assessment by dieticians using criteria as recommended by the CARI and DOQI guidelines. Nutritional assessment and intervention are also provided for pre dialysis patients. Hyperphosphatemia and achieving optimal phosphate control continues to be a major challenge to our dialysis patients.

9. The Pre-dialysis clinic is coordinated by the Renal Clinical Nurse Consultant (CNC), Shelley Tranter and involves our dietician, pharmacist and social worker. It operates on a one on one basis with chronic kidney disease patients and their important others to assist their education about CKD and help prepare them for dialysis and transplantation. From January to December 2008, there were 41 new attendees; 27 males, 14 females. As at Dec 31st 2008 there were 87 active patients on this database.

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 2008	***24***	***45***	***10***	***22***
St George 2005	59	0	20	22
St George 2006	61	0	20	18
St George 2007	59	0	20	21
St George 2008 %(n)	**44** (109/249)	**14** (34/249)	**19** (48/249)	**23** (58/249)

Indicators from NSW Health 2007, pp.iii - iv. St George measurements indicate how these indicators are being measured and the results for 2008.

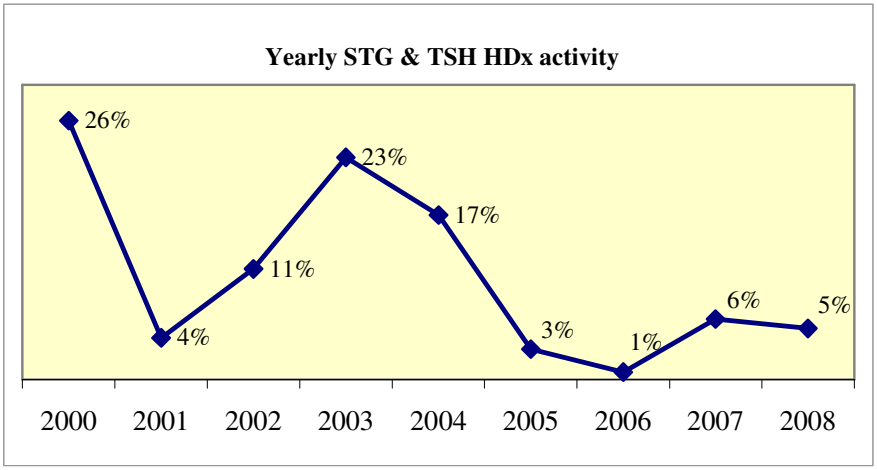
Principles	Indicators	St George Measurements
Integrated secondary prevention programs for CKD	1. Proportion of eligible patients with GFR <30ml/min when first seen by Nephrologist	1. Not measured
Patients with a diagnosis of CKD receive timely, appropriate investigation, information, treatment and follow-up.	2. Proportion of patients commencing dialysis whose first referral to a nephrologist is <90 days prior to first dialysis	2. Haemodialysis late referral rate 29%. Peritoneal Dialysis late referral rate 10%. ANZDATA late referral 24%.
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. 59% (33/56) of new dialysis patients attended the pre-dialysis clinic for education and assessment before treatment commenced in 2008.
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. 29% patients' commenced haemodialysis with a functioning AVF; SVG or AVG. ANZDATA 2008 result was 35% (NSW) and 39% (Australia).
Patients with CKD requiring treatment, have access to clinically	5. Proportion of patients dialysed at home.	5. Total STG dialysis population: Home=42% (19% home haemodialysis &

Principles	Indicators	St George Measurements
appropriate forms of treatment either in home, community or hospital facilities, designed around individual patient needs, including transplantation services where clinically appropriate.	6. Travel time - Proportion of patients for whom travel time to their dialysis location is ≤ 1 hour.	23% PD) ANZDATA NSW = 32% **25% of all STG haemo patients dialyse at home (ANZDATA AUS=13%, NSW=15%)* 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. 8. Proportion of eligible patients who receive adequate haemodialysis (i.e. URR ≥ 65%) 9. Proportion of eligible haemodialysis patients with total weekly dialysis hours > 15 hours. 10. Proportion of eligible peritoneal dialysis patients with CCL >50L per week (or Kt/V ≥ 1.8). 11. Vascular access infection events per 100 patient catheter days. 12. Number of peritoneal infections per peritoneal dialysis patient-month. 13. Renal Transplant survival at 1, 3, 5 years	7. Not measured. 8. 90% URR ≥ 65% ANZDATA 2008: 92% URR ≥ 65% 9. St George: 26% >15 hours per week, 45% ≥15 hours per week. ANZDATA 2008: 38% dialyse ≥15 hours per week 10. 80% had a CCL >50L (75% had a Kt/V ≥ 1.8) 11. CVC infection rate 0.09/100 catheter days. 12. Incidence per patient months = 24.6 compared to 19.4 for the whole of Australia (ANZDATA). 13. No data available
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. 15. Patient survival after Renal Transplant at 1, 3, 5 years.	14: Survival 2001-2006 Patient Survival 1yr 3yr 5yr STG Hdx 77.3 50.5 39.6 Aust Hdx 85.2 64.7 46.7 STG PD 87.4 37.5 Aust PD 82.5 50.3 29.7 15: No data

HAEMODIALYSIS

Activity

The total haemodialysis activity level for St George patients (incentre and satellite) increased 5% from 21,713 dialyses in 2007 to 22,843 in 2008. This growth in activity is similar than the same period last year (6%) but is as expected from National data. The figure below shows the annual percentage growth in dialyses over the past 8 years.



Patient Flow:

		2006	2007	2008
Incentre haemodialysis patients at beginning of year		**128**	**141**	**144**
IN	New patients	39	28	33
	Transfers from other units	1	2	3
	Temporary transfer from PD	2	4	6
	Permanent transfers from PD	15	10	14
	Failed transplants	3	1	3
	Transfer from Home HDx	1	4	2
	Transfer from Satellite			5
Subtotal		**61**	**49**	**66**
Out	Transplants	4	4	5
	Transfers to other units	5	2	2
	Transfers to Home HDx	6	6	7
	Transfers overseas	1	0	0
	Transfers to PD	4	12	14
	Transfer to Satellite			39
	Regain function			1
	Deaths (medical causes)	15	11	17
	Deaths (withdrawal from dialysis)	13	11	16
Subtotal		**48**	**46**	**101**
Net gain		**13**	**3**	**-35**
Incentre haemodialysis patients at end of year		**141**	**144**	**109**

		2008
Satellite haemodialysis patients at beginning of year		**0**
IN	New patients	0
	Transfers from other units	2
	Permanent transfers from PD	1
	Transfer from Incentre	39
Subtotal		**42**
Out	Transplants	1
	Transfers to Home HDx	2
	Transfer to Incentre	5
	Deaths (medical causes)	0
	Deaths (withdrawal from dialysis)	0
Subtotal		**8**
Net gain		**34**
Satellite haemodialysis patients at end of year		**34**

		2006	2007	2008
Home haemodialysis patients at beginning of year		**45**	**51**	**49**
IN	New patients	7	1	5
	Transfers from PD	1	0	0
	Transfers from incentre HDx	6	6	6
	Failed transplant	0	1	0
Subtotal		**14**	**8**	**11**
Out	Transplanted	7	1	6
	Transfers to incentre HDx	1	4	2
	Transfer to other unit	0	1	1
	Deceased	0	4	1
Subtotal		**8**	**10**	**10**
Net gain/loss		**6**	**-2**	**-1**
Home haemodialysis patients at end of year		**51**	**49**	**48**

Comments:

- The opening of the Sutherland Satellite dialysis unit in March 2008 provided patients within the Sutherland shire less travelling time for their dialysis. At 31st December 2008 34 (18%) STG patients were dialysing at this facility. The ANZDATA 2008 report indicates 57% of haemodialysis patients dialysis within a satellite facility. Full capacity for this unit is 48 patients. A possible increase to patient numbers in this facility may occur in 2009 as well as a home training position.
- Home haemodialysis trained 6 patients at St George hospital. Four 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 13% in Australia and 15% in NSW as stated in the ANZDATA 2008 report.
- An increase in the overall death rate occurred in 2008 (18%) compared with the ANZDATA 2008 report (15%). Deaths due to withdrawal from haemodialysis remains higher for St George (8%) compared to ANZDATA (6%).

ACCEPTANCE ONTO HAEMODIALYSIS

Background

- The data for this audit consisted of patients who commenced incentre and home haemodialysis in 2008.

How did we Record, Store and Analyse the Data?

- Data was collected from ANZDATA forms, dialysis patient files, doctor's 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

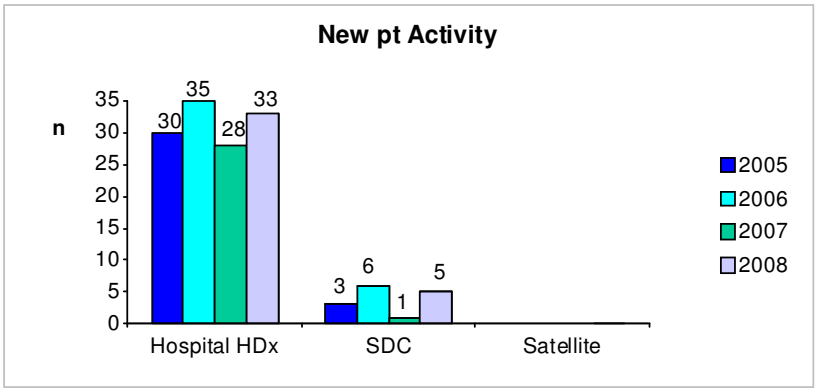
Data Benchmark

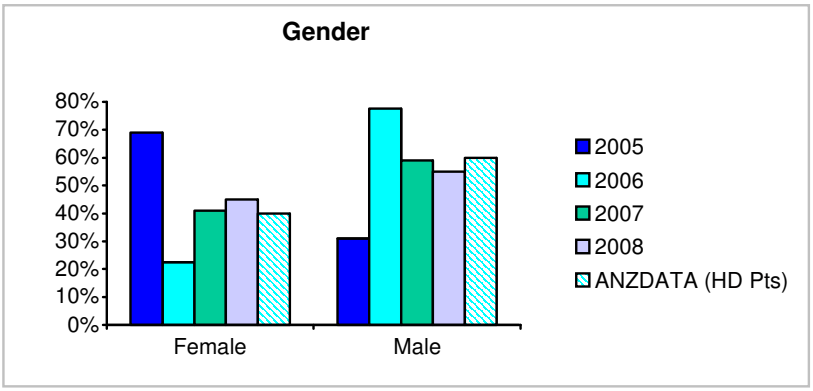
- Audit results are compared to the previous audits and ANZDATA 2008 report.

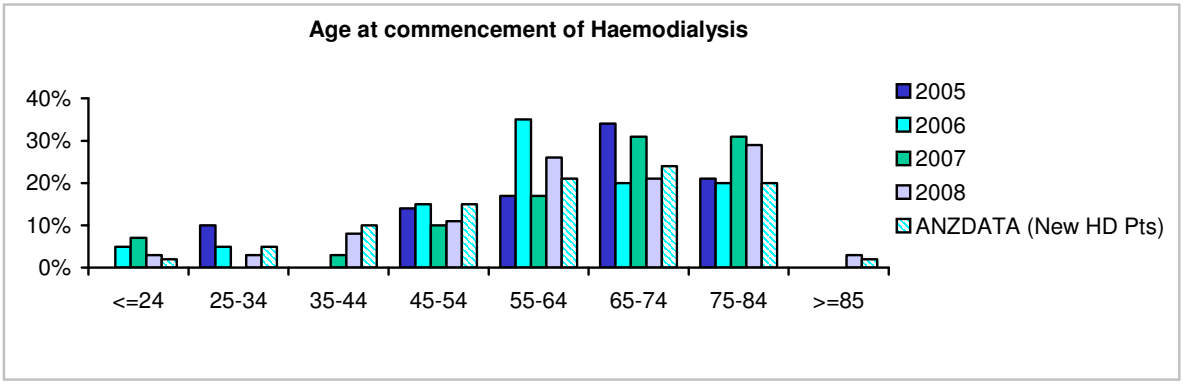
Activity

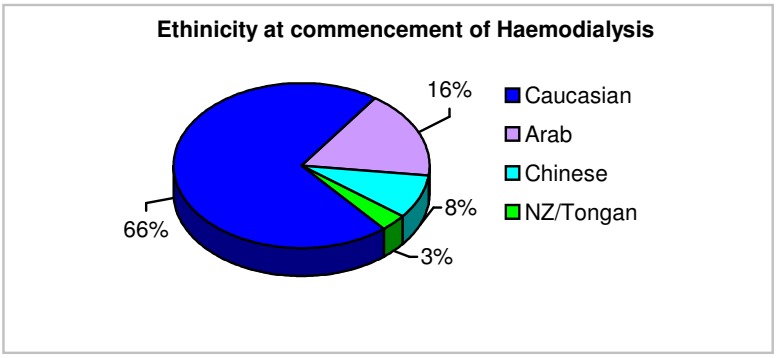
- 38 patients commenced incentre or home haemodialysis (directly) for ESRD with no previous dialysis in 2008 (excludes patients from PD, failed transplant patients and patients dialysed for <1month).

Outcomes



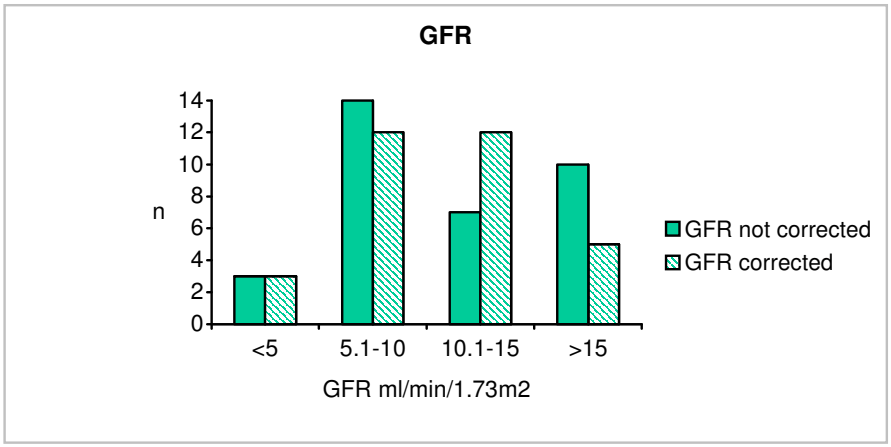




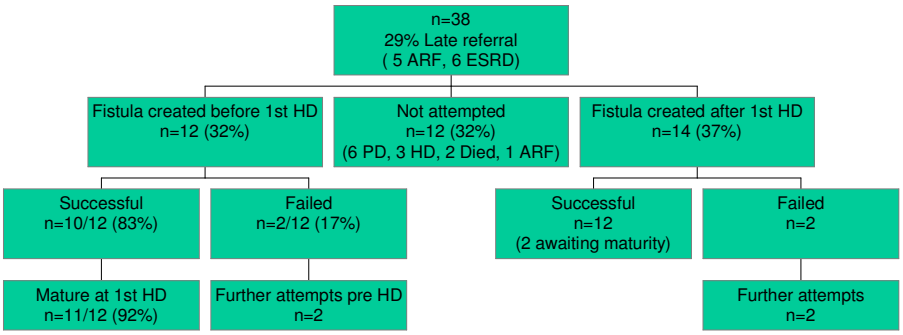


Co-morbidities present at commencement of haemodialysis

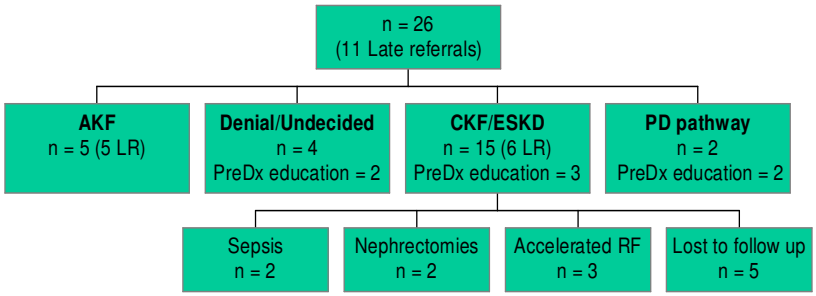
Co-morbidity	St George 2007	St George 2008	ANZDATA (HD pts)
Chronic Lung Disease	28%	21%	17%
Coronary Artery Disease	41%	26%	45%
Peripheral Vascular Disease	3%	16%	27%
Cerebrovascular Disease	10%	13%	17%
Diabetes	31%	34%	46%
Smoking - Never	43%	55%	47%
Former	57%	34%	40%
Current	0%	11%	13%
Late Referral	21%	29%	25%

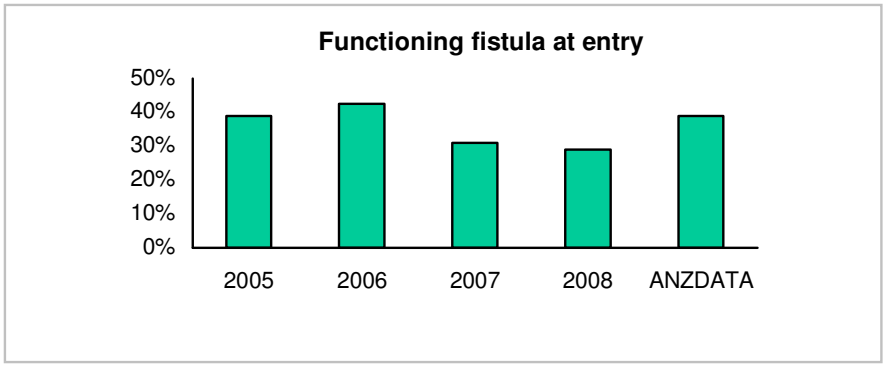


Fistulas in new patients



No access created before commencing dialysis





Comments:

- The average age of patients commencing haemodialysis was 64yr, median age 65yr**.** The ANZDATA report indicates the average age for all new patients commencing dialysis was 60years. Fifty three percent of new patients in 2008 commencing haemodialysis at St George at an age of 65yr or older compared to 62% in 2007. Seven percent higher than ANZDATA 2008 report. In 2008 our first patient aged 85 years commenced dialysis.
- Seventeen percent of patients were NESB.
- Overall co-morbidities were lower than ANZDATA 2008 report with the exceptions of chronic lung disease. The incidence of coronary artery disease at entry was 19% lower than ANZDATA and 15% lower than 2007.

- The late referral rate reflects patients who were referred to nephrologists less than three months prior to commencing dialysis. The late referral rate was higher than 2007 and that of the ANZDATA 2008 report.
- The GFR is estimated by the Cockcroft-Gault formula. The Average corrected GFR was 12.6ml/min/1.73m^2 with a median GFR of 10.4ml/min/1.73m^2. Whilst the average GFR not corrected for body surface area was 11.8ml/min/1.73m^2 and the median GFR of 10.1ml/min/1.73m^2.
- Thirty two percent of new patients had a fistula attempted in 2008, 92% of these patients had a mature functioning access at their first haemodialysis which has improved each year. Excluding the late referral patients, 41% of new patients had a fistula attempted before their first dialysis. The ANZDATA 2008 report indicates 50% of patients (excluding late referrals) have a functioning access at their first haemodialysis. One patient who was a late referral had a fistula attempted prior to commencement although required further surgery. The average time to access creation before commencement of haemodialysis was 208days (range 40-791days). The median time was 153 days which was lower than 2007. Seventeen percent of these patients required further surgery on their access.
- Twenty-six patients (69%) had no access created before their first haemodialysis, eleven of who were late referrals from ARF or were lost to follow up within the health system. The majority of patients without an access were known to the nephrologists with CKF but their renal function deteriorated more rapidly than predicted due to sepsis, the necessity for bilateral nephrectomies or accelerated renal failure.

Identified strengths and weakness:

- A higher rate of late referral patients in 2008 has reduced our overall number of patients commencing dialysis with a mature functioning fistula.
- Although the median and average time to access creation before first haemodialysis was lower in 2008 than 2007, the number of mature functioning access has improved (92% in 2008, 75% in 2007, 64% in 2006). This has highlighted the importance of continual monitoring of the access within the predialysis patient.
- 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 2008 from 137 and 139 chronic incentre and satellite haemodialysis patients respectively.

Outcomes being measured

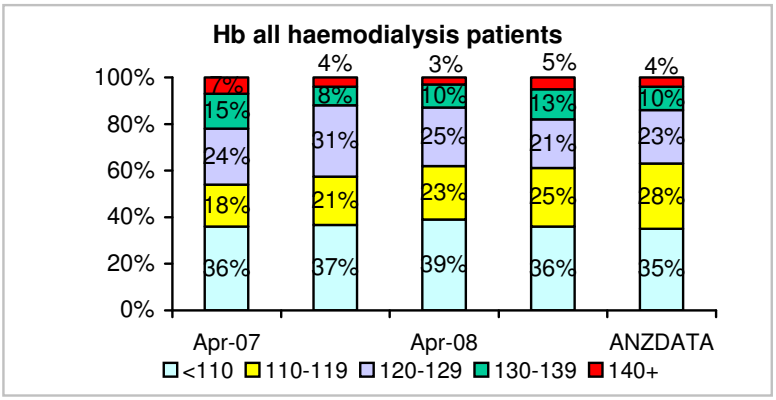
- Our aim is to compare our unit's performance against the National recommended guidelines (CARI) for the following parameters: Ca, PO4, Corrected Ca, Ca PO4 product, Albumin, Mg, Hb, Fe studies, Bicarbonate and dialysis adequacy (KT/V).
- Audit results are also compared to previous audit results and the ANZDATA 2008 report.
- Lipid target range is set by the National Heart Foundation for high risk patients.

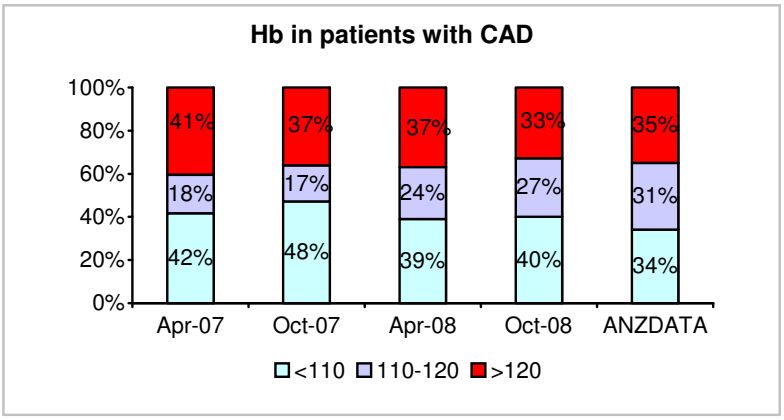
How did we Record, Store and Analyse the Data?

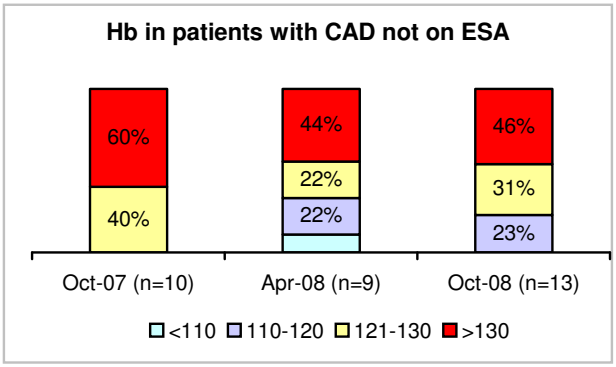
- Blood results were entered into an Excel Database.
- Analysis of data and basic statistics was performed using the SPSS 15 statistical program.

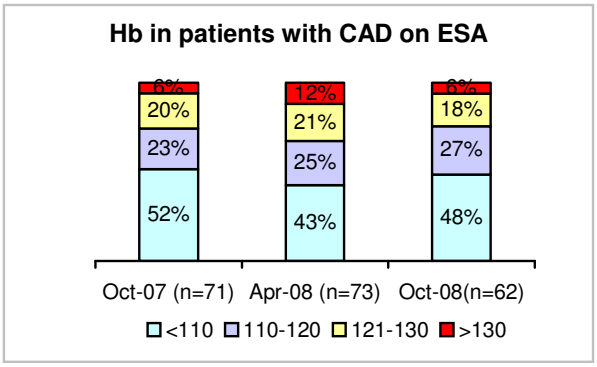
Outcomes & Recommendations:

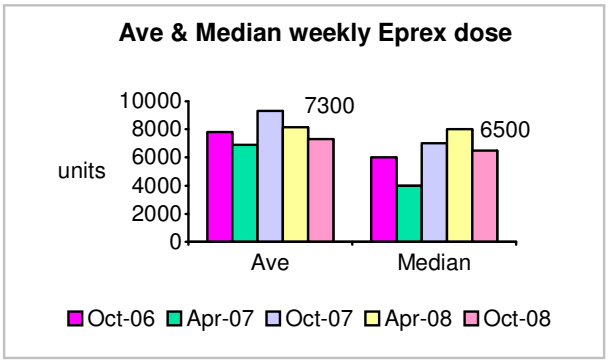
<u>Haemoglobin</u>

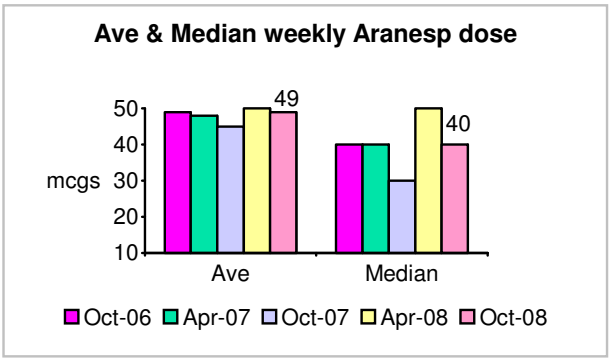








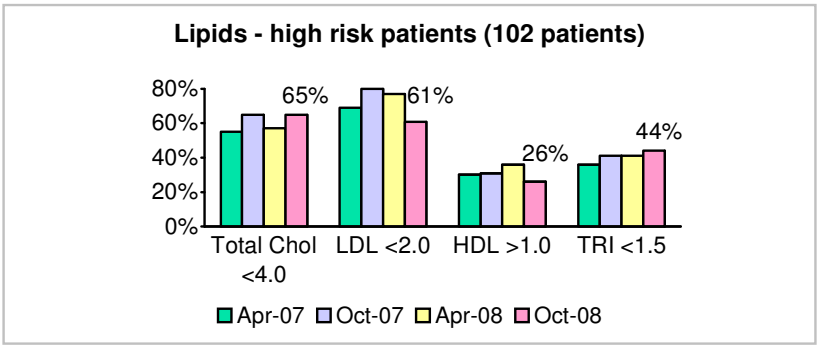




Comments:

- KDOQI (2007) recommendation for target Hb should *generally* be in the range 110-120g/L due to fluctuations and variability in Hb levels.
- Out of 62 patients' who have CAD and are on Erythropoietin Stimulating Agent (ESA), 48% had an Hb<110g/L whilst a decrease was seen in Hb>130g/L.
- The median Hb for all patients during the latest audit was 115, SD 14.0, min 81, max 149.
- KDOQI recommend Hb targets in dialysis patients receiving ESA should not exceed >130g/L (KDOQI 2007). Additionally, CARI (2008) advises against Hb>130g/L as it is associated with increased mortality in CKD patients.
- The number of patients not on ESA increased by 5%. Seventy seven percent of patients are on Aranesp, 7% on EPREX and 16% not on ESA. The average and median weekly dose of ESA has decreased compared to previous audits.

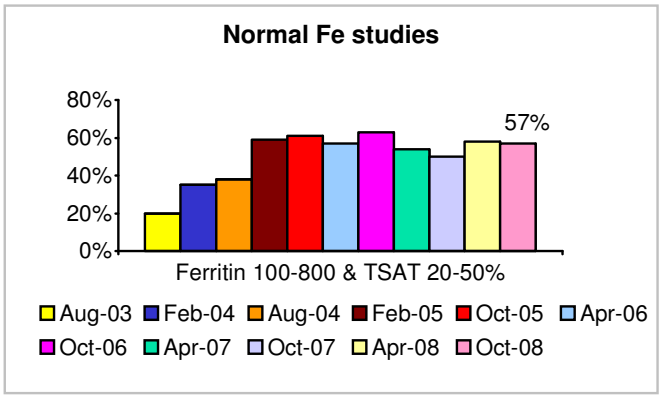
Lipids

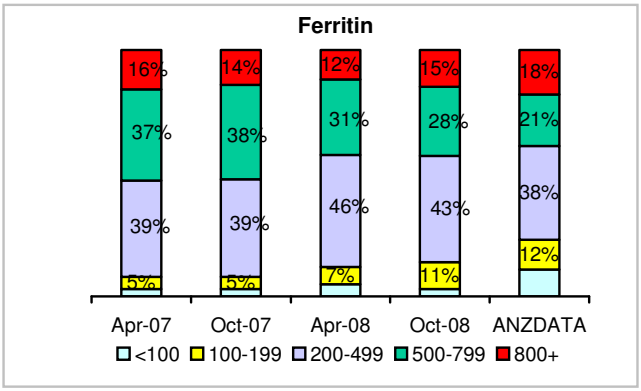


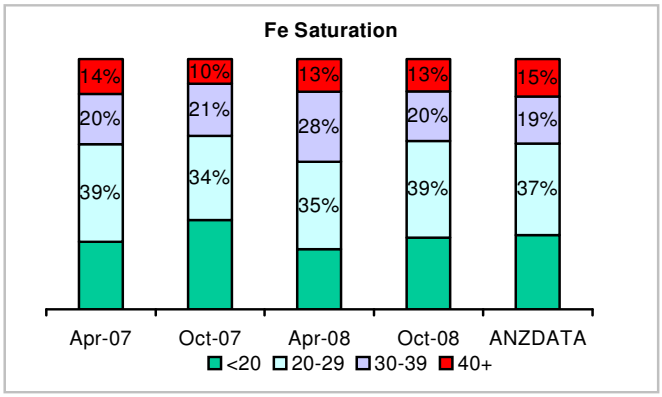
Comments:

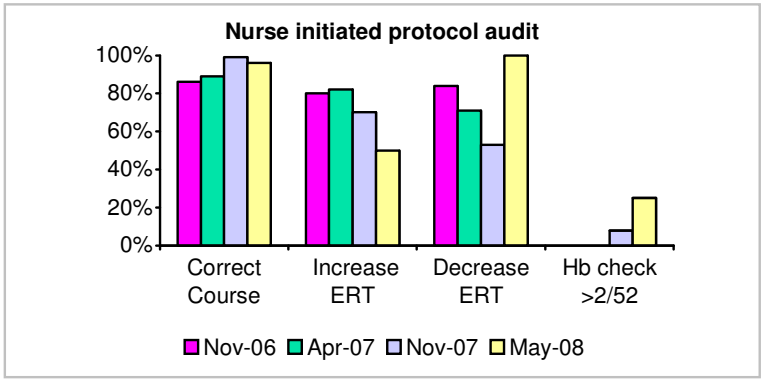
- Ranges are recommended by the 2005 national heart foundation.
- No significant differences occurred even thou 10% less patients achieved the recommended ranges for HDL and 16% for LDL compared to the last audit.
- Data is collected only on high risk patients i.e. with or suspected CAD, PVD, CVD, DM or obesity. Seventy three percent of incentre and satellite haemodialysis patients were considered high risk during October 2008 audit.

Total Iron studies





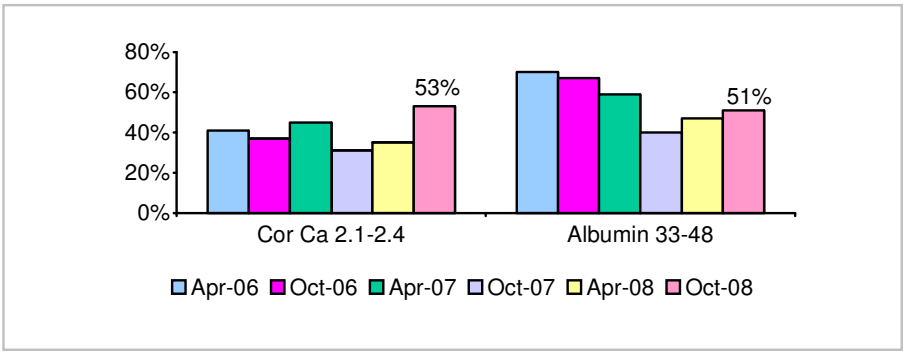




Comments:

- Fifty seven percent of all patients in October 2008 were iron replete with a ferritin level between 100-800ng/mL and iron saturation between 20-50%. Marginally higher than April 2008 audit but no significant difference seen.
- Eighteen percent of patients in October 2008 had a ferritin level >800ng/L which was higher to previous audits. Most of the high ferritin levels correlate with patients' recent hospital admission.
- The iron audit was conducted in May 2008, which reviews compliance with the nurse initiated protocol. The correct course was chosen 96% of the time in the last audit. A reduction in the number of times the ESA was requested to be increased occurred compared to previous audits, but an improvement to 100% in requesting a decrease or cease ESA occurred. Rechecking Hb 2/52 post ESA dose change improved from the previous audit.

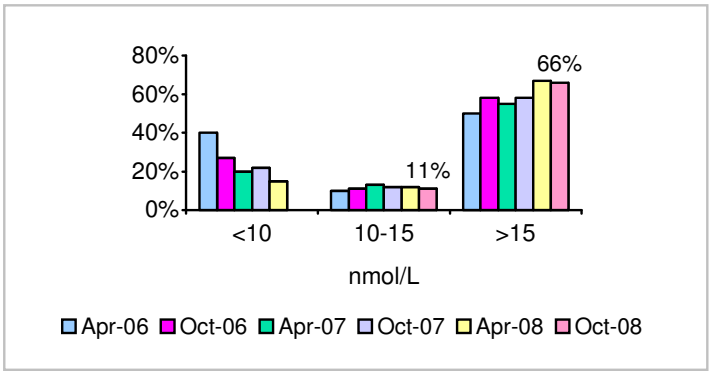
Corrected Ca & Albumin



Comments:

- Kruskal-Wallis Test *(H)* performed on corrected calcium between October 2007 and October 2008 indicated p=<0.005. Eighteen percent of patients had normal corrected calcium compared to the last audit.

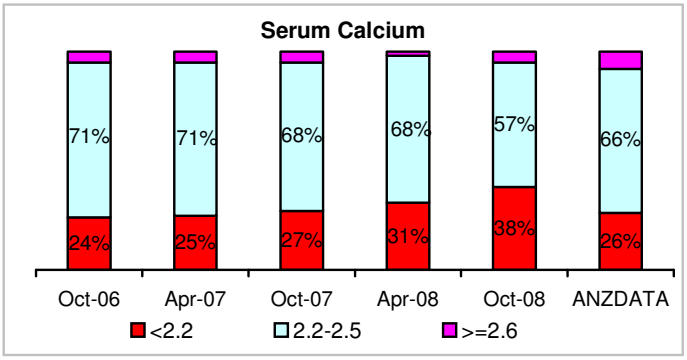
PTH

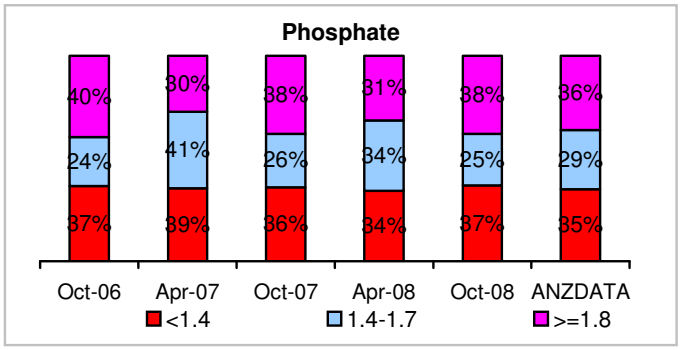


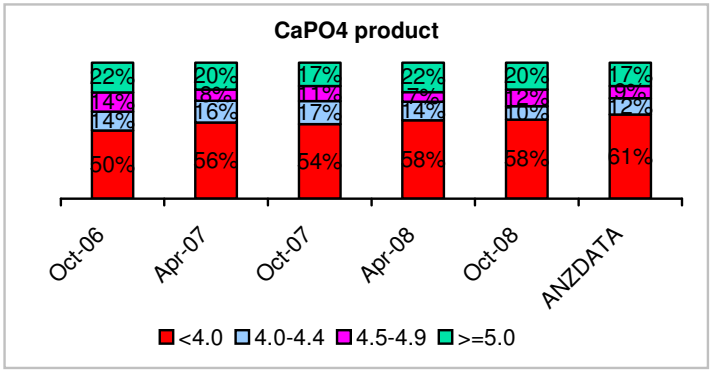
Comments:

- Patients with parathyroidectomies were excluded in the data if PTH <10.

Serum Calcium, Phosphate & CaPO4 Comparison with ANZDATA



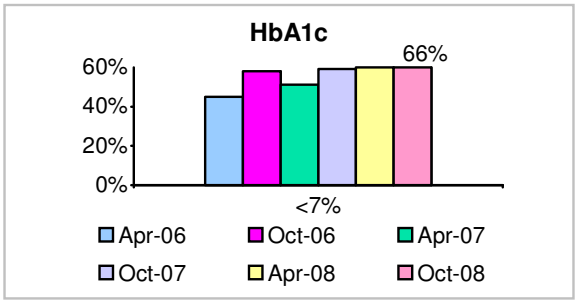




Comments:

- There were a greater number of patients hypocalcaemia compared to previous audits and ANZDATA 2008 report.
- Calcium phosphate product and phosphate results are comparable with the 2008 ANZDATA report and previous audits.

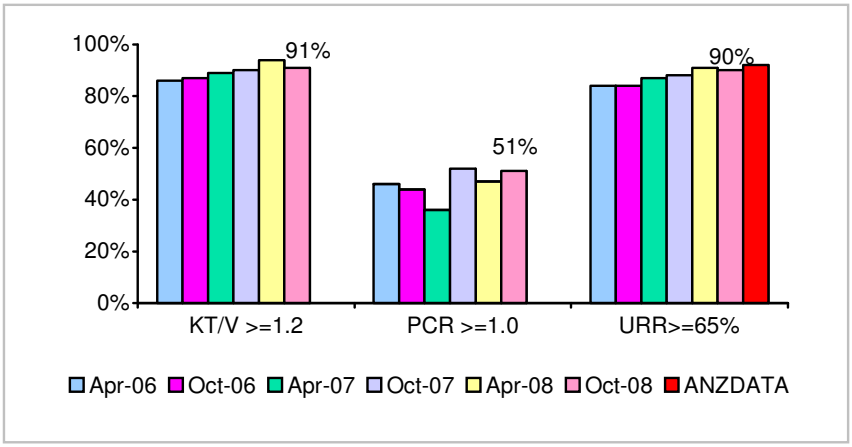
HBA1C



Comments

- Data was collected on 58 (44%) diabetic patients during the last audit with similar results over the last 18 months.

Adequacy



Comments

- Dialysis adequacy continues to be achieved and remains comparative with ANZDATA.

Identified strengths and weakness:

- Through increased awareness and education to cease or withhold ESA in patients with Hb>130g/L a reduction in Hb>130g/L was seen.
- The allocation of a 0.21 FTE CNS anaemia co-ordinator position in 2009 will provide closer anaemia surveillance and ESA management.
- There was 96% compliance in administrating the correct iron course with the nurse initiated iron protocol and 100% correct action was taken when Hb>130g/L occurred.

HAEMODIALYSIS WATER QUALITY

Background and Activity Levels

- The water quality is audited on 4 West incenter and satellite dialysis unit 2nd monthly for micro-organisms, Aluminium, chloramines and total chlorine.
- The U.S. Association for the Advancement of Medical Instrumentation (AAMI) guidelines 2004 and European Best Practice Guidelines (EBPG) 2002 are used to provide a standard to monitor water quality.
- Full element analysis is conducted biannually and endotoxins are collected yearly.
- The hospital biomedical department previously collected the water specimens, followed up abnormal results and maintained the equipment. Gambro now performs this task.
- The audits are required to prevent infection amongst haemodialysis patients and maintain patient safety.
- Daily chloramine testing of central RO water is performed by nursing staff at each site using a chlorine test kit.

Outcome being measured

Incentre		
Date	**H2O (<200 CFU/mL)** Action required >50 CFU/mL	**Endotoxins (<2 EU/mL)** Action required >1 EU/mL
Mar 08	CWP Normal, WRO (water trolley/portable RO) 95 CFU - retested	
Apr 08	CWP Normal, WRO all >50 CFU, new WRO used May	<0.25
Jun 08	Missed	
Jul 08	CWP Normal	
Aug 08	WRO 1188 230CFU - removed	
Sep 08	CWP Normal	
Oct 08	CWP Normal, WRO 1191 66CFU - disinfected	
Dec 08	Incorrect testing - resample taken Jan 09	

Satellite		
Date	**H2O (<200 CFU/mL)** Action required >50 CFU/mL	**Endotoxins (<2 EU/mL)** Action required >1 EU/mL
Feb 08	CWP >100 CFU, Post RO 95 CFU	<0.005
Mar 08	Normal range	
Apr 08	Normal range	<0.25
Jun 08	Missed	
Jul 08	Normal range	
Aug 08	Normal range	
Oct 08	Normal range	
Dec 08	Incorrect testing – resample taken Jan 09	

Incentre	
Date	**Elements** **Al 0.01mg/L, Chloramines 0.1mg/L, Total Cl 0.5mg/L**
Apr 08	Normal range
Jun 08	Missed
Jul 08	Normal range
Aug 08	Normal range
Oct 08	Fluoride and Chloramine elevated
Dec 08	Major service pre-treatment system - retested samples normal

Satellite	
Date	**Elements** **Chloramines 0.1mg/L, Total Cl 0.5mg/L**
Feb 08	Normal range
Apr 08	Normal range
Oct 08	Fluoride elevated
Dec 08	Major service pre-treatment system - retested samples normal

Comments:

- The 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 (WRO). Both WRO were replaced with new WRO throughout the year.
- Testing was missed in June at both sites, Gambro was informed and testing occurred in July.
- Elevated fluoride and chloramine levels were detected in October sampling. These results were first viewed in December once staff requested to obtain the results. Gambro were informed of the abnormal results and retesting occurred after routine servicing to the pre treatment system. Resample results were within the guidelines recommendations.
- Incorrect laboratory testing occurred with the December samples and resample were required.
- Second monthly aluminium testing is no longer required as results are within normal range. Aluminium will be monitored within the biannually heavy metal schedule.

Identified limitations and strengths:

- Process and communication failures were seen throughout the year with Gambro performing water testing. As a result of this, a decision amongst the NUM was made not to use high flux dialysers until the system is secure. Continual surveillance and communication is required to ensure Gambro are maintaining to the water schedule.

VASCULAR ACCESS

Background and Activity level

- CARI and KDOQI guidelines advocate the preferred haemodialysis access is a native AV fistula.
- The Vascular Access Nurse assesses patients post access surgery, and provides follow up post surgery until the patient commences dialysis to assess maturity of access.
- Data includes access used for new patients commencing their first haemodialysis in 2008 as well as current home, incenter and satellite haemodialysis patients.

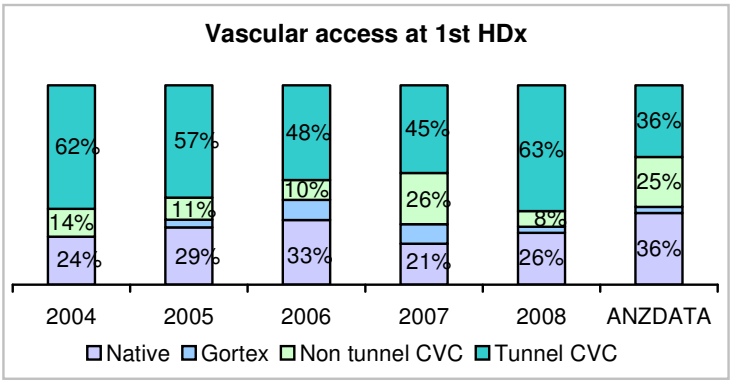
How did we Record, Store and Analyse the Data?

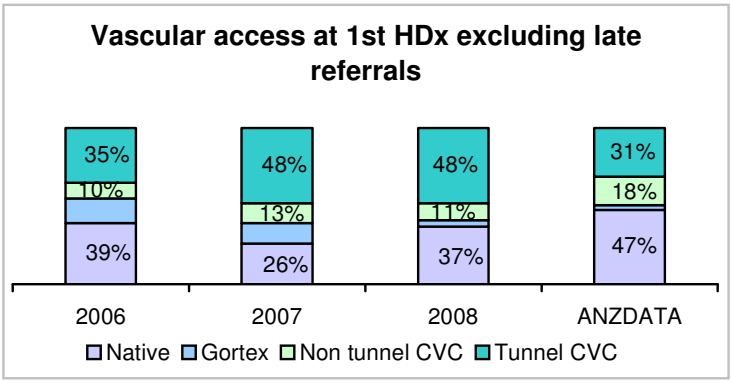
- Data was collected from operation reports at St George public and private hospitals and during follow up visits.
- Data is store in the RISC database and the Access Excel database.
- Data is collected on access at first haemodialysis during 2008 and current patients access at 31st December 2008.

Data Benchmark

- Data is benchmarked against ANZDATA 2008 report and KDOQI 2006 guidelines.

Outcomes



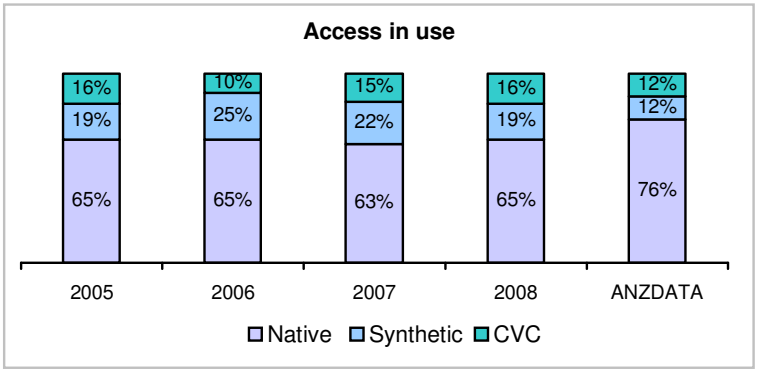


Comments:

- The ANZDATA 2007 report indicates the overall use of native fistulas as an initial access is decreasing and CVC use is increasing.
- Excluding late referral patients, 41% of new patients had a mature functioning fistula for their first session. ANZDATA 2008 reports the use of vascular access

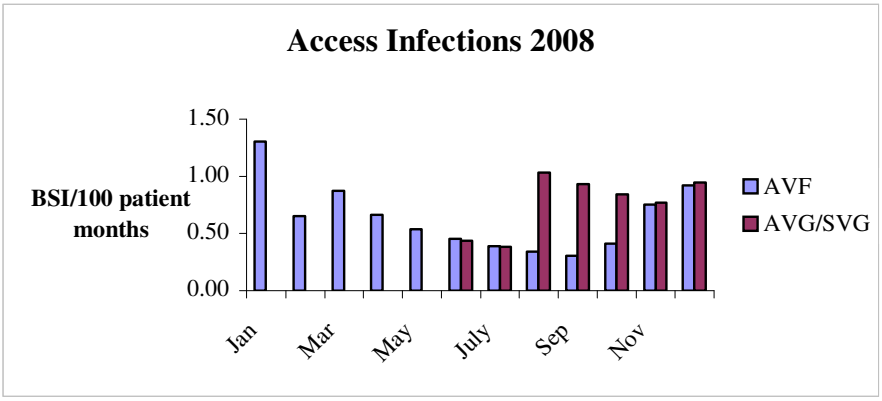
(native and graft) for first dialysis at 50%. The late referral rate for St George was higher (29%) than ANZDATA 2008 (23%). This was due to a higher incidence of patients with CRF not being followed up in the community and resulting in ESRD on first presentation.

- The incidence of non-tunnelled CVC used for first dialysis (8%) decreased from previous years. As tunneled CVC are associated with a reduced infection rate less non-tunneled catheters were consequently inserted. The incidence of tunneled CVC use remains higher at St George (63%) compared to ANZDATA 2008 report (36%).



Comments:

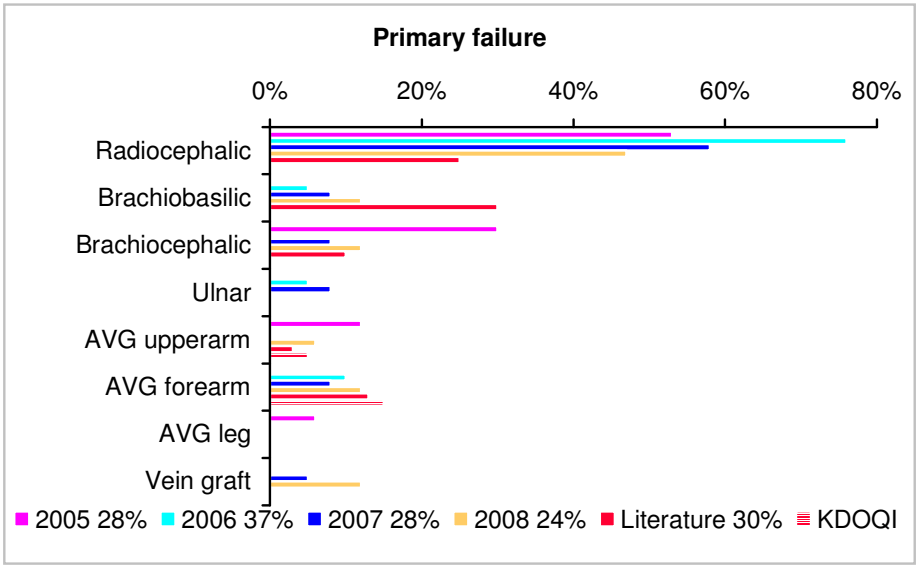
- The KDOQI 2006 evidence based practice guidelines recommends fistula use in 40% of prevalent patients. Sixty five percent of patients at St George have a native fistula.
- The KDOQI 2006 guidelines suggest <10% of chronic haemodialysis patients have a permanent catheter. Six percent of the St George population has a permanent catheter access for dialysis, which is increasing each year.
- Data from the Dialysis Outcomes and Practice Patterns Study (DOPPS) indicates the mortality risk associated with the use of a catheter (relative risk, 1.32; 95% confidence interval, 1.22 to 1.42) or graft (relative risk, 1.15; 95% confidence interval, 1.06 to 1.25) was higher than fistulas (Pisoni et al, 2009).



	Cumulative Blood stream infection (BSI) range AVF	Cumulative Blood stream infection (BSI) range AVG
2008	0.31-1.3 BSI/100 pt months	0.95-1.03 BSI/100 pt months
2007	0.0-1.32 BSI/100 pt months	2.17-6.21 BSI/100 pt months

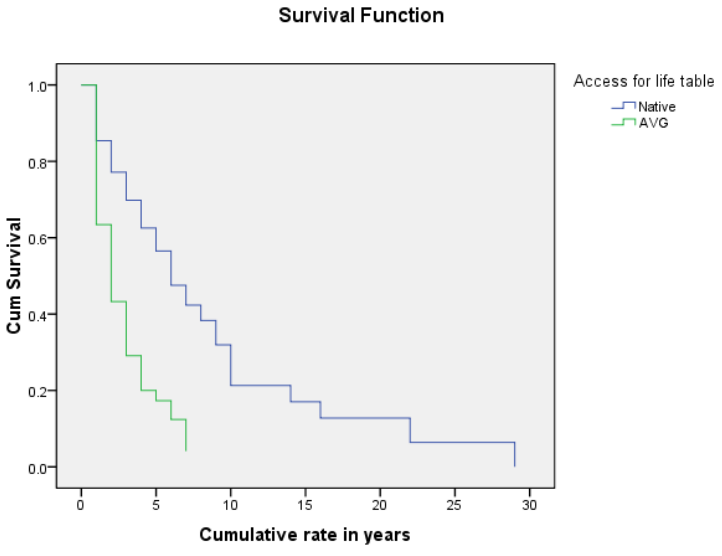
Comments:

- Blood stream infections amongst permanent vascular access in 2008 reduced from 2007 as a result of protocol and procedure changes.
- An increased infection rate late 2008 coincided the unavailability of Chlorhexidine skin prep solution.
- A regular quarterly infection control meeting continues 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.
- Submission of permanent vascular access blood stream infection rates commenced in 2008 to the NSW Health department ACHS Indicators.



Comments:

- Fifty-eight new access or first access were formed and a further 13 fistulas/gortex were revised in 2008. The primary failure rate of these accesses was 24%. 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%.



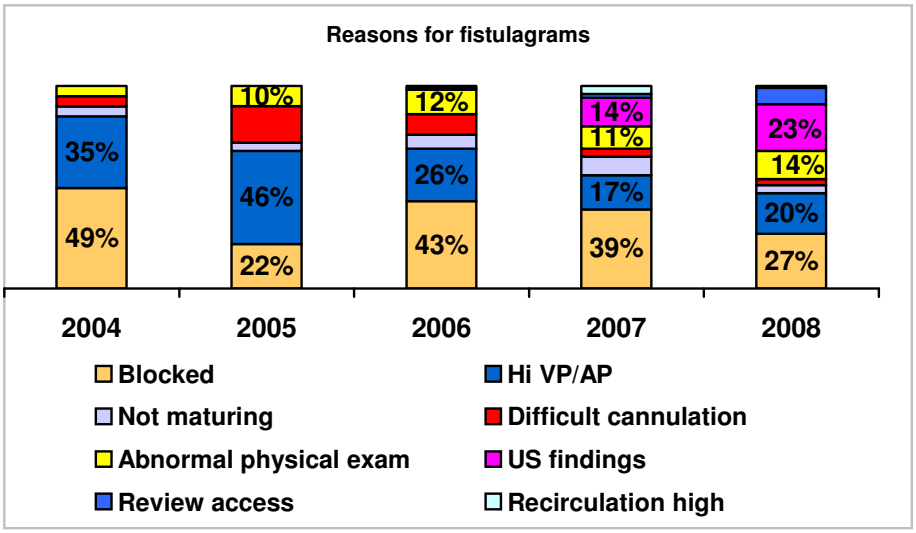
Comments:

- 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 2.16 years and AVF 6.9 years, similar to previous years.
- Data includes all current patients and deceased patients since 2004. A follow up life table was used with censored patients being those whose accesses are still functioning. The endpoint was access lost, death or transplanted or transferred with a functioning access.

Access surgery	2006	2007	2008
First access	48	26	35
Revision	30	25	13
New access	9	13	23
Thrombectomy	5	13	14
Other access surgery (ligation, evacuation haematoma, excision, abscess drainage)	5	13	6
Fistulagram	80	95	100

Comments:

- For the majority of 2008 St George hospital only had 1 vascular surgeon.
- In 2008 less revisions occurred although a larger number of new access were created.
- As a larger focus on access monitoring and surveillance is undertaken amongst the unit an increase in pre-emptive fistulagrams has occurred.



Comments:

- A Pearson Chi-Square 42.0 p=0.000 indicates that pre-emptive investigations (fistulagram) and access failure are dependant. Reasons for pre-emptive fistulagram consist of high venous or arterial pressures, not maturing access, difficulty with cannulation, abnormal physical assessment, abnormal ultrasound findings or recirculation.
- Eighty percent of access did not fail when a pre-emptive fistulagram was performed. When no intervention (fistulagram) was taken 68% of access failed. Data includes all fistulagrams performed since 2004.
- In 2008, 100 fistulagram procedures were performed resulting in 76% salvaged, 17% requiring surgical intervention 4% no action. In 2007, 95 fistulagrams were performed with 70% salvaged, 24% required surgical intervention and 3% no action.

Identified limitations and strengths:

- Due to the extensive review of the literature and implementing several strategies within the renal department in 2007 as a response to increased infection rates amongst AVF and AVG, infection rates reduced in 2008.
- To improve primary failure rates all patients will undergo venous mapping pre access creation.
- In 2009 there will be two new vascular surgeons appointed at St George, which will assist in timely access surgery.

CENTRAL VENOUS CATHETERS

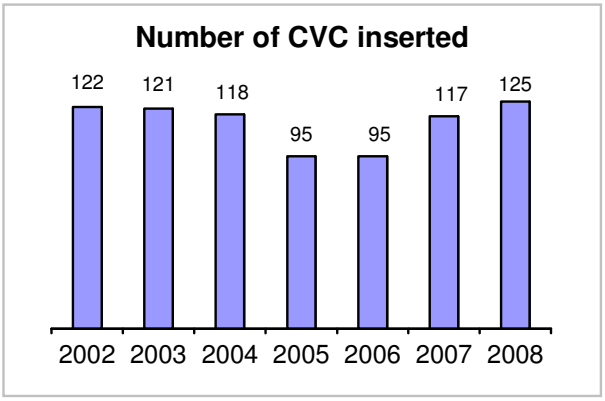
Background

- 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.

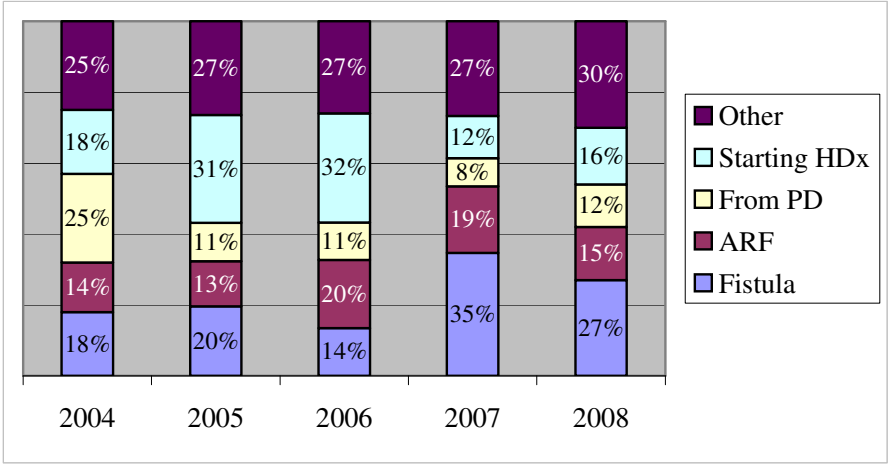
Activity Level



Comments:

- The number of catheters inserted for haemodialysis has increased from previous years. The type of catheters inserted in 2008 remains predominantly Bard hemi-glide tunneled cuffed internal jugular catheters (79%). The remainder were temporary Arrow non–tunnelled femoral or subclavian catheters.

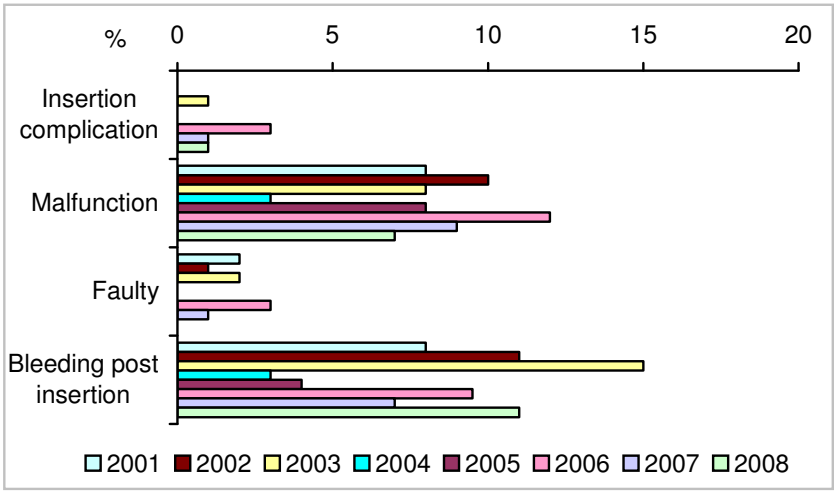
Reason for insertion of catheters in 2008



Comments:

- In 2008 the vascular access practice development (PD) group reviewed all dialysis staffs access competencies and developed a buttonhole competency. Additionally the group implemented a vascular access assessment tool to ease with physical assessment and to identify access dysfunction early. The primary nurse performs this assessment tool monthly and any abnormalities are reported to the vascular access nurse for further assessment.
- There was a lower incidence of patients requiring a CVC insertion for fistula or graft infections in 2008 due to several changes to infection control policy within the unit. These changes included reinforcement of aseptic techniques, reinforcement of patient and staff hand washing as well as access washing pre-cannulation, change of cleaning solution for cannulation trolleys and pre-cannulation skin prep, changes in taping cannula exit sites, administration of IV prophylactic antibiotics and antimicrobial wash pre access surgery and fistulagram procedures.
- The number of patients transferring from PD and requiring a CVC was similar to previous audits.
- Patients' requiring a CVC to start haemodialysis has reduced since 2006.
- Other includes replacing a non-tunneled catheter with a tunneled, malfunction of the catheter and replacing an infected or faulty catheter.

Complications related to insertion

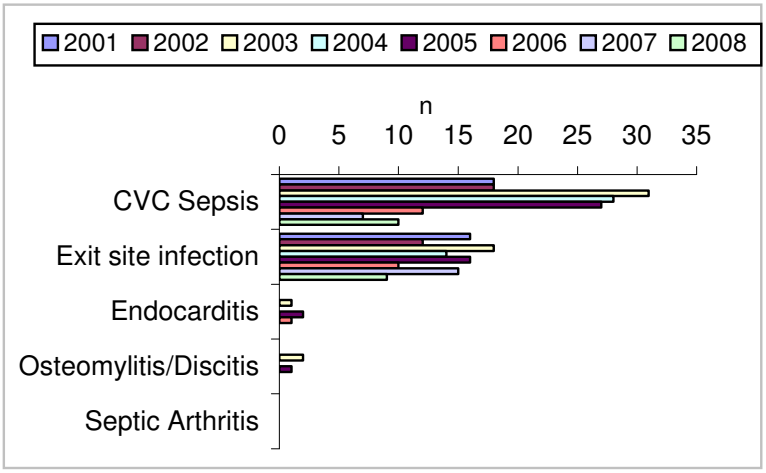


Comments:

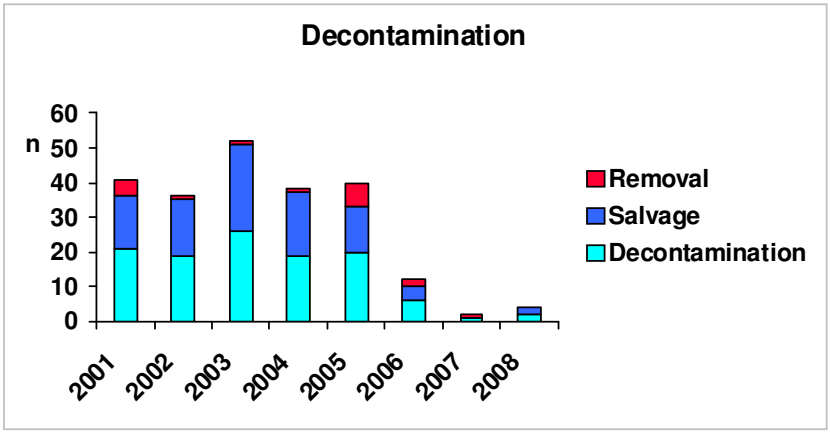
- There was a reduced rate of catheters malfunctioning in 2008 (7%) compared to previous audits
- There were two insertion complications in 2008. An iatrogenic injury of SVC occurred during the insertion of an IJ tunnelled CVC in radiology, the tip of catheter was inserted into the wall of the SVC causing a haemothorax. Another IJ tunnelled CVC was inserted into the R atrium wall causing thrombus formation to the patient. This catheter was inserted in theatre. Insertion complication includes pneumo/haemothorax, pseudoaneurysm, IJ perforation, carotid perforation and catheter tip embedded into R atrium.
- The number of tunnelled CVC that bleed post insertion has increased in 2008. A review of these patients indicated half had an elevated APTT post insertion. These patients were not on anticoagulants and received heparin free

haemodialysis post catheter insertion. The average pre insertion platelet count was 203 (normal 150-450). The radiology department was consulted and indicated the heparin lock was made up to the exact lumen volume to prevent heparin leaking into the bloodstream. Since liaising with the radiology department, less bleeds have occurred.

Catheter infection rates



	Catheter related bacteremia (CRB) rate	Exit site infections (ESI) rate
2008	9% (0.91episodes/1000catheter days)	8% (0.83 episodes/1000catheter days)
2007	6% (0.74 episodes/1000catheter days)	10% (1.26 episodes/1000catheter days)
2006	12.5% (1.24 episodes/1000catheter days)	11% (0.93 episodes/1000catheter days)
2005	28% (3.0 episodes/1000catheter days)	17% (1.7 episodes/1000catheter days)

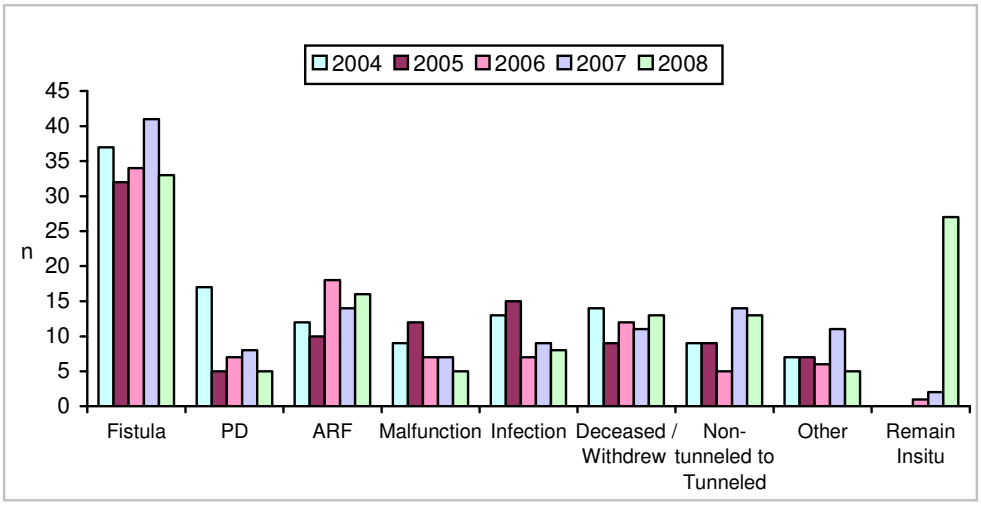


Comments:

- 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. There were no femoral inserted non-tunnelled catheter infections in 2008.
- 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. In July 2008 the CVC exit site care procedure changed to Chlorhexidine instead of Betadine after Bard allowed Aqueous Chlorhexidine to be used on tunnelled cuffed CVC. This change in protocol has reduced ESI in 2008.
- The main causative organism in 2008 for CRB and ESI was MRSA. Due to reduced CRB only two catheters required decontamination in 2008.
- Since the implementation of the prophylactic antibiotic heparin lock in 2006 the need to decontaminate infected catheters has reduced. The cost of a decontamination (medications alone) is approximately $310.
- In 2008 two catheters were decontaminated and both remain insitu. One patient experienced profuse bleeding post insertion and then grew MRSA in his catheter. The other catheter had negative isolates but underwent decontamination.

Reason for catheter removal

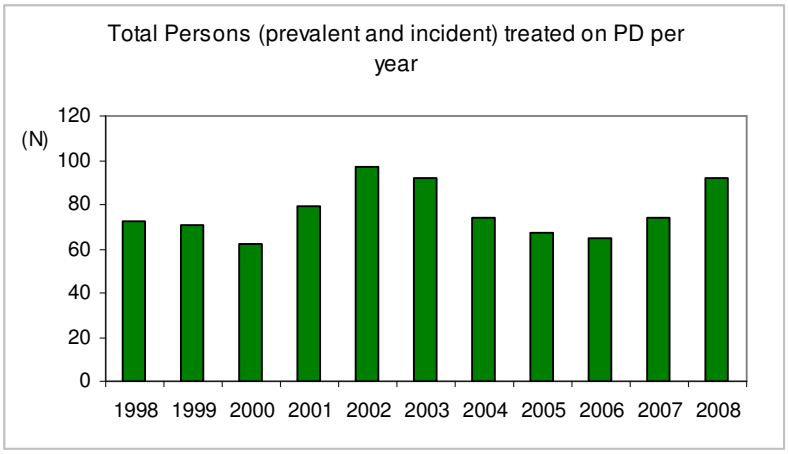


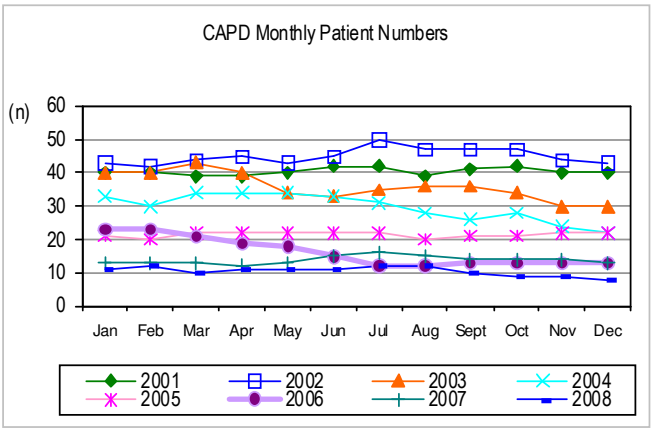
Comments:

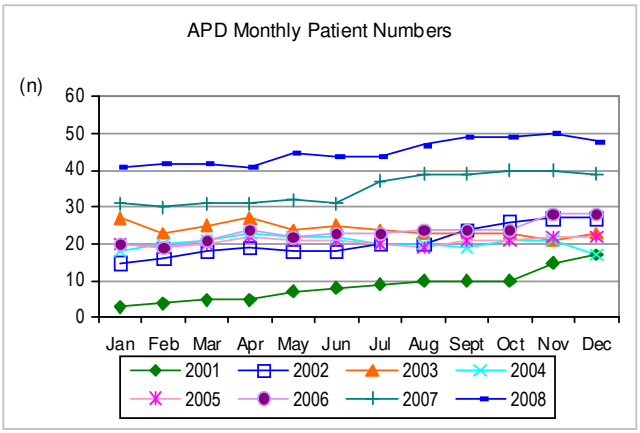
- The main reason for removal of CVC remains fistula maturation.
- The number of CVC removed due to CRB, ESI or clinical sepsis continues to be low since implementation of the gentamicin/heparin lock. Other indicates patients transferred to other units, insertion problems and tunnel breakdown.
- The average number of days non-tunnelled catheters were insitu in 2008 was 7, which was the same as 2007. The average number of days a tunnelled catheter was insitu was 109 days, which was also similar than previous years.

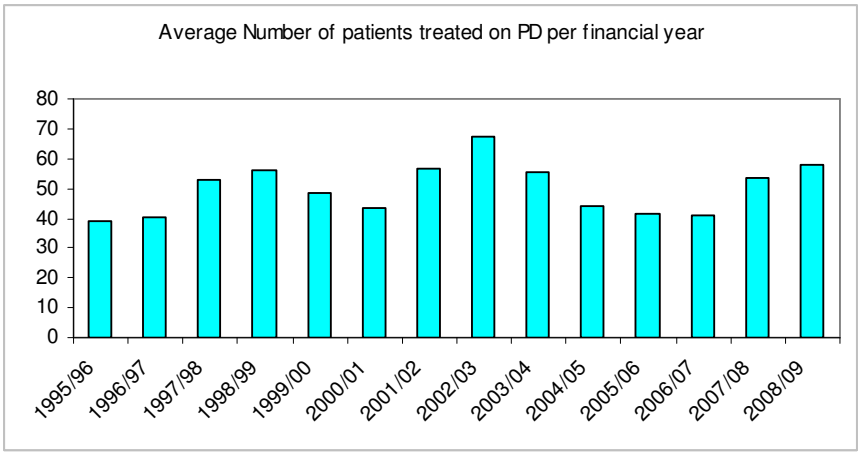
PERITONEAL DIALYSIS

The peritoneal dialysis (PD) unit has increased its number of prevalent and incident patients in 2008 with a net gain of 6 patients. A total of 85 patients were treated on PD during the year (excluding hospital IPD) compared to 74 in 2007 and 65 in 2006. In December 2008 the proportion of patients receiving automated peritoneal dialysis (APD) was 86%, and the proportion of continuous ambulatory peritoneal dialysis (CAPD) was 14%. Our APD population is still over and above the proportion reported by ANZDATA (2008) of 53%. 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 31st Annual Report 2008 (data to 2007)

- ANZDATA results show an increase in the prevalence of people using automated peritoneal dialysis (APD), up 14% Australia wide. The St George peritoneal dialysis unit continues to increase the numbers of patients on automated peritoneal dialysis, in December 2008 the APD population increased by 11% from 2007 while the CAPD population continues to decline; down by 11% from December 2007.

APD	*ANZDATA 53% (1126/2106)*	*St George 86%*
CAPD	*ANZDATA 47% (980/2106)*	*St George 14%*

Patient Flow – Peritoneal Dialysis

Balance carried forward: Peritoneal dialysis patients as at 01.01.2008 (n=52)

In	New Patients	20	
	New patient transfer from Haemodialysis (1 from failed graft)	10	
	Returns from HD	5	
	On hospital IPD 31.12.2008	2	
	In Subtotal		37
Out	Transplants	1	
	Transfer to other units	0	
	Transfer to Home Haemodialysis	0	
	Temporary Transfers to Haemodialysis	5	
	Permanent Transfers to Haemodialysis	16	
	Withdrawal from dialysis	3	
	Deaths on CAPD	6	
	Out Subtotal		31
	Net Gain	**6**	
	PD patients at end of 2008 (includes hospital IPD)		**58**

Peritoneal Dialysis activity rates using the ANZDATA 31st annual report for comparison

	St George 2008 (%)	ANZDATA 2008 (%)
Transplants	2	7
Change to haemodialysis permanent	28	20
Change to haemodialysis temporary	9	5
Deaths on Dialysis (PD)*	10	14
Deaths due to withdrawal*	5	4

Note: The rates are calculated using the total number of patients on peritoneal dialysis at 31.12.2008 (n=58), the method used by ANZDATA to calculate their rates. *ANZDATA rate calculated to exclude ages <15 years.

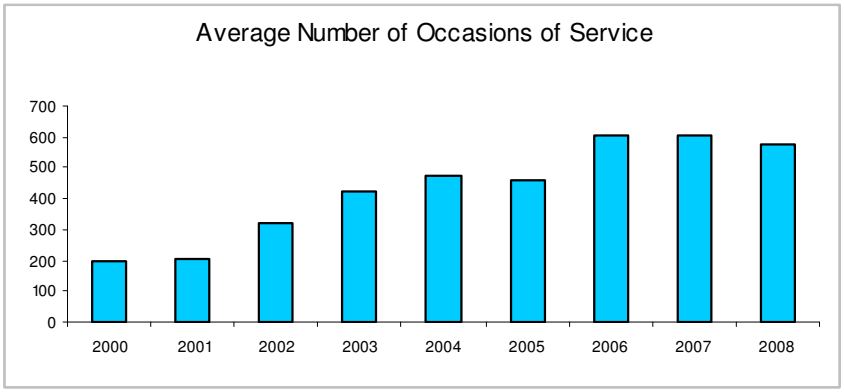
Patients changed to haemodialysis for a variety of reasons:

- Surgery including hernia (n=2)
- Infection (major cause) (n=5)
- Inadequate dialysis (n=3)
- Dialysate leak (n=4)
- Failed training (n=2)
- Catheter insertion complications (n=1)
- Drain problems (n=1)
- Blocked catheters (n=2)

The percentage of deaths on peritoneal dialysis is 4% lower than the ANZDATA Australian rate; the withdrawal rate is 1% higher (equal difference to 2007).
The percentage of permanent transfers to haemodialysis is 8% higher than ANZDATA, an increase from 2007. Temporary transfers are 1% higher than ANZDATA. There was an increase in numbers of patients with inadequate dialysis, dialysate leaks, catheter problems (mechanical and surgical) along with failed training which accounted for the increase in permanent transfers to haemodialysis.

Workload

In 2008 the PD unit provided 146 training days for PD patients with training time varying from 4 - 25 days (average 8 days). There were 7231 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 92 hospital admissions in 2008 compared to 89 in 2007 for peritoneal dialysis patients. The breakdown of these is as follows; 24 related to peritonitis (15 in 2007), 52 related to peritoneal dialysis catheter insertion, removal or repositioning (50 in 2007), 6 related to patients requiring hospital IPD (intermittent peritoneal dialysis) for either post insertion dialysis or under dialysis (22 total IPD in 2007), 2 fluid overloads, 1 PD leak, 1 machine problems, 3 drain problems or blocked catheters, 1 anaemia, 1 A & E only, and 1 kidney transplant (POW).

PD Dialysis Adequacy, Biochemical and Haematology targets

Aim

To compare dialysis adequacy using haematological markers, biochemical markers and Kt/V with previous audits; October '08 (58), April '08 (47), October '07 (51), April '07 (40). 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 2008 for the current dialyzing PD patients and compared to previous audits.

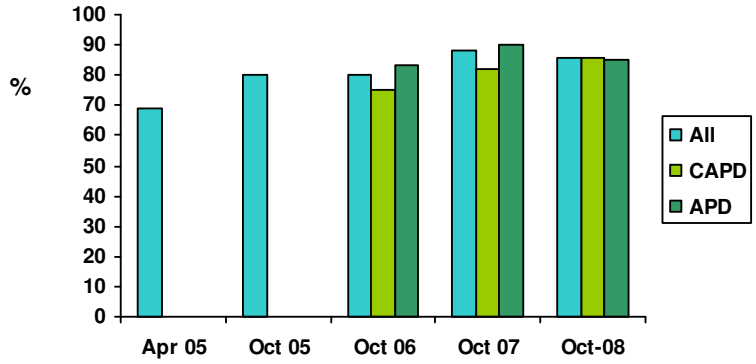
Method

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.

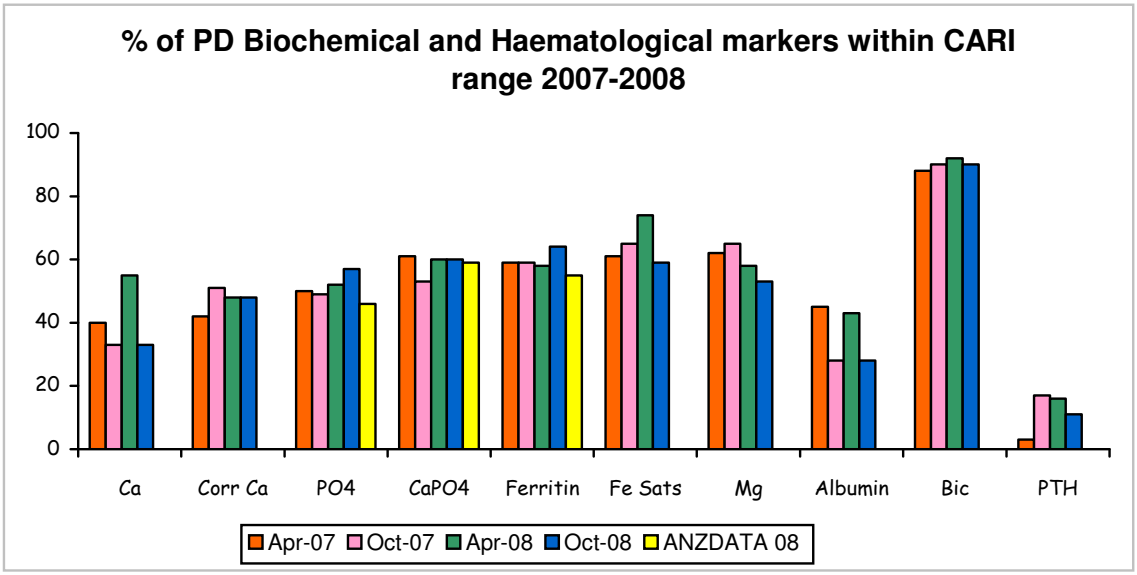
The renal CNC collates these results into spreadsheets using Microsoft Excel and Minitab v15 or SPSS v15 for statistical analysis. These results are compared to the previous year and measured against the benchmark set by the CARI guidelines. If any action is required, a meeting is organised with the 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 CNC will follow up and report the results six monthly.

Percentage of patients who achieved a Kt/V ≥ 1.6



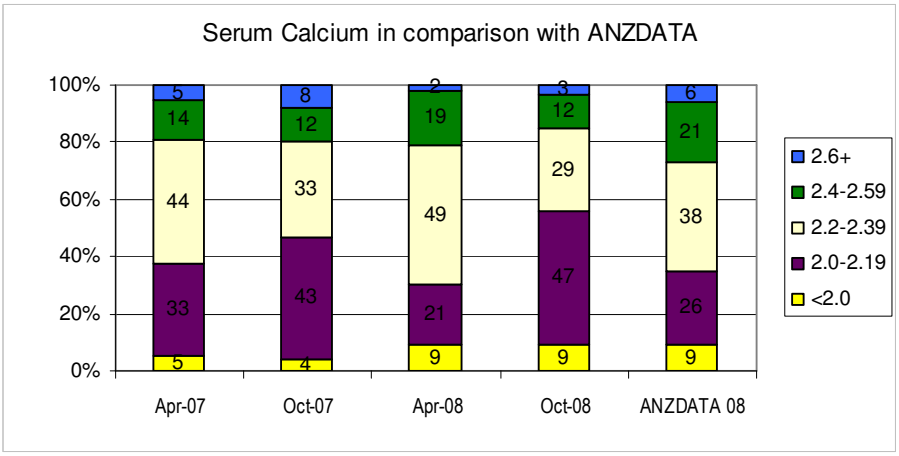
Statistics:

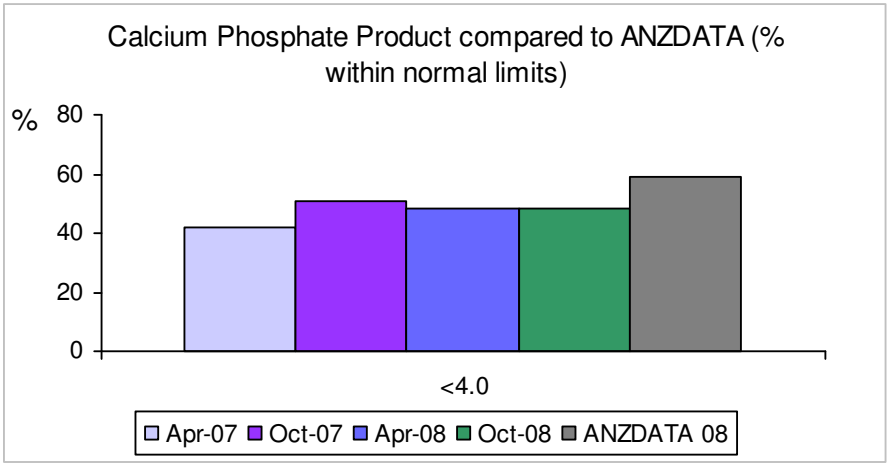
Oct 07 Mean: 2.13, SD .519
Oct 08 Mean: 2.36, SD 0.8

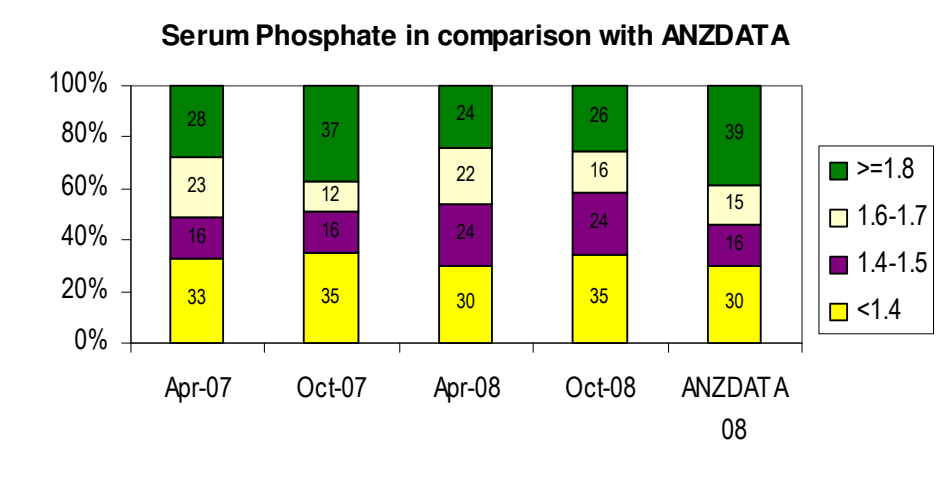


Results: % of patients falling within the target range

Parameter	Target	Apr 07	Oct 07	Apr 08	Oct 08	ANZDATA 08
Ca	2.25-2.58 mmol/L	40	33	55	33	-
Corr Ca	2.1-2.4 mol/L	42	51	48	48	-
PO4	0.8-1.6 mmol/L	50	49	52	57	46
$CaPO_4$	<4.0 mmol/L	61	53	60	60	59
Ferritin	200-800 ug/L	59	59	58	64	55
Fe Sats	20-50%	61	65	74	59	-
Mg	0.74-1.03 mmol/L	62	65	58	53	-
Albumin	33-48 g/L	47	28	43	28	-
Bic	20-30 mmol/L	88	90	92	90	-
PTH	10-15 nmol/L	3	17	16	11	-
KT/V	≥ 1.6	-	88		86	-
CCL	> 50L	-	84		80	-





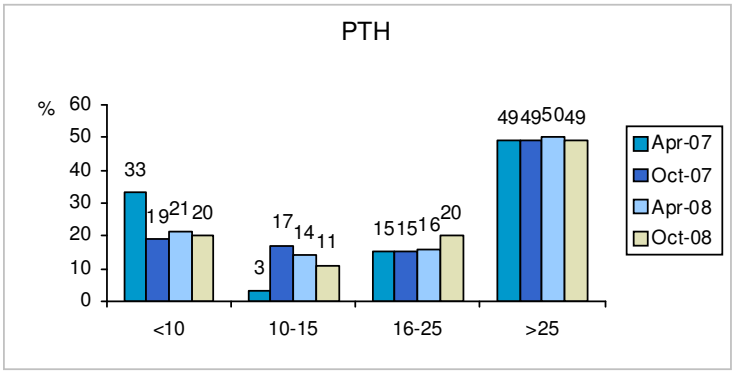


Calcium and Phosphate

- Calcium results show fluctuation over 2008; October had a greater percent of patients with low serum calcium (2.0 – 2.19). This seems to be mirrored in the pattern through 2007. The sample means in April and October '08 were 2.21 & 2.27 mmol/L.
- Phosphate results are similar throughout 2008 and have a greater percent of patients <1.6 compared to ANZDATA. The sample mean in Oct '08 was 1.55 compared to 1.60 in April '08.

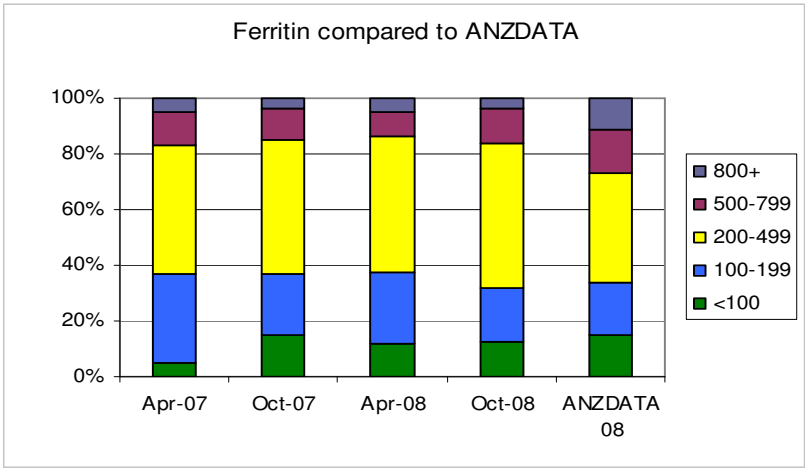
PTH

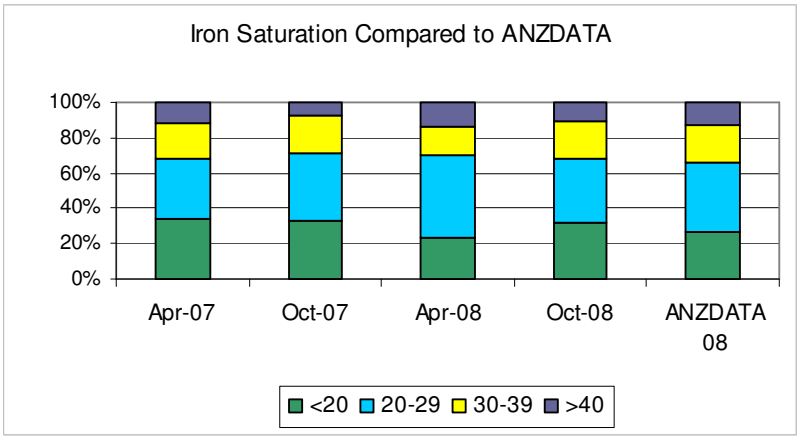
- In October 2008, 11% of peritoneal dialysis patients had a PTH within the recommended limits set by CARI of 10-15 nmol/L, 20% had a level less than 10 while 20% were between 16-25 and 49% were >25.
- The maximum recorded PTH in October '08 was 145, the sample mean was 43.7 (median 26.6) nmol/L.
- These results show a higher percent of patients with a PTH >15 nmol/L, but there is no statistical significance.



Iron

- The CARI guidelines recommend the administration of supplementary Iron to prevent iron deficiency and to achieve and maintain an Hb concentration of 110-120 g/L (CARI 2006), with or without the use of an erythropoiesis-stimulating agent. Bolus administration of IV iron (Ferrosig 500mg) is easy to administer and is the treatment of choice in the St George renal unit. The Ambulatory Care unit administers this by appointment after the patients have been prescribed the drug by the renal registrar or consultant. Nurse initiation of this process commenced in earnest in early 2008.
- There has been no statistically significant improvement in the Ferritin and Iron Saturation results, but the Ferritin graph demonstrates an increase in the percent of patients within the range 200-800 in October 2008 with results better than those benchmarked by ANZDATA while Iron saturations are similar to ANZDATA. This is likely to be a result of the nurse initiated process.

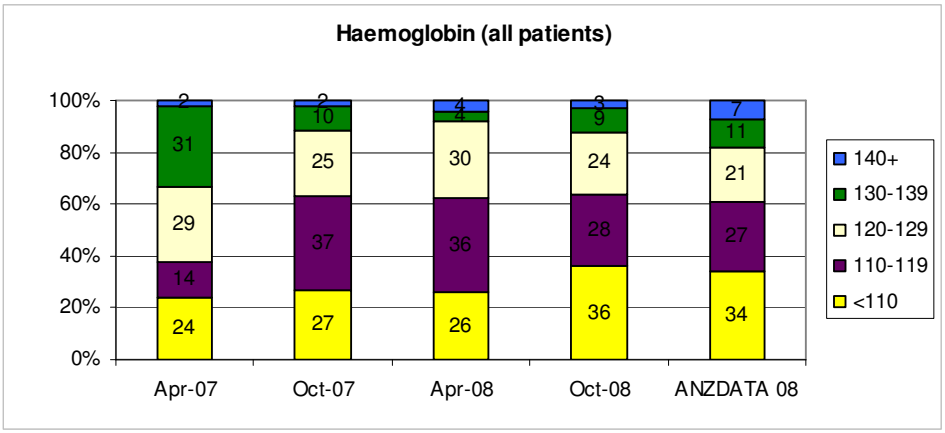


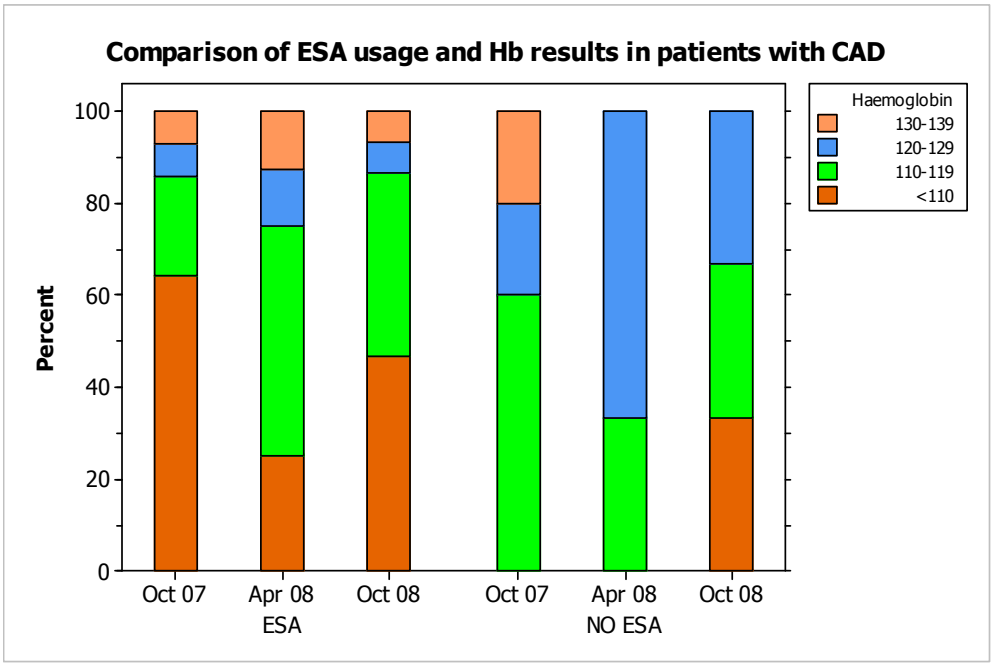


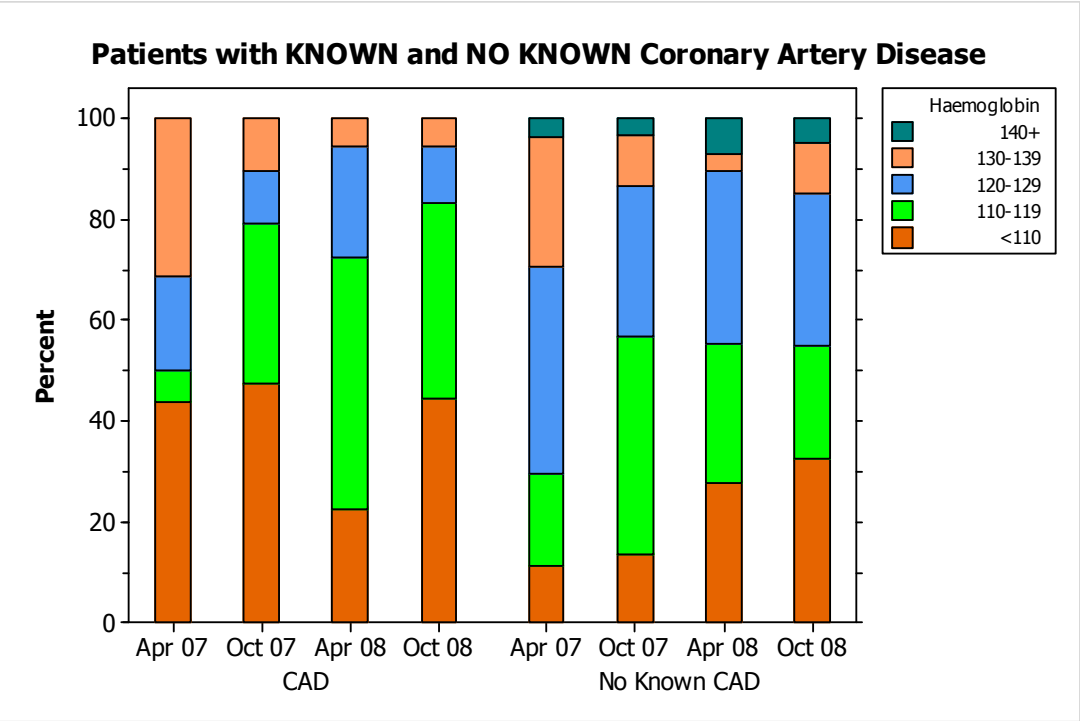
Haemoglobin

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

- The October 2008 PD population had a very similar result to ANZDATA. These results were not an improvement on April 2008 despite the introduction of a nurse initiated iron protocol.
- CAD patients on an ESA continue to have a greater percent of Hb's <110 g/L than those on no ESA indicating ongoing monitoring is essential. This group has a much improved percent of patients between the normal range of 110-120 in 2008. Patients <u>not</u> on an ESA have an increase in Hb's <110 g/L in October, and a reduced percent of patients >120 g/L since Oct 07 (no Hb was >140 g/L). Continuing the nurse lead iron management program is of benefit to the patients when trying to maintain haemoglobin between the tight limits of 110-120 g/L.







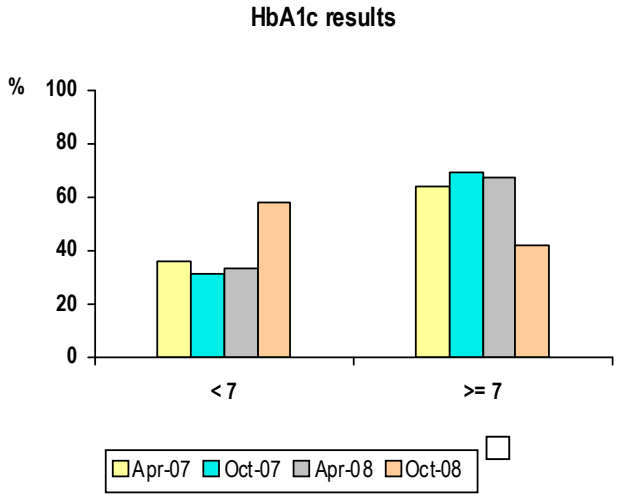
- In October 2008, 30% of the patients were known or suspected of having coronary artery disease (CAD).

- Analysis of haemoglobins in CAD and non CAD patients in 2008 show similar percentages of 'NO KNOWN CAD' patients with an Hb >120 from Oct 07, while 'CAD' patients reduced the percent of high haemoglobins.

- April 2008, on the commencement of nurse driven iron management, results show an increase in patients with an Hb 110-120 g/L in the 'CAD' group.

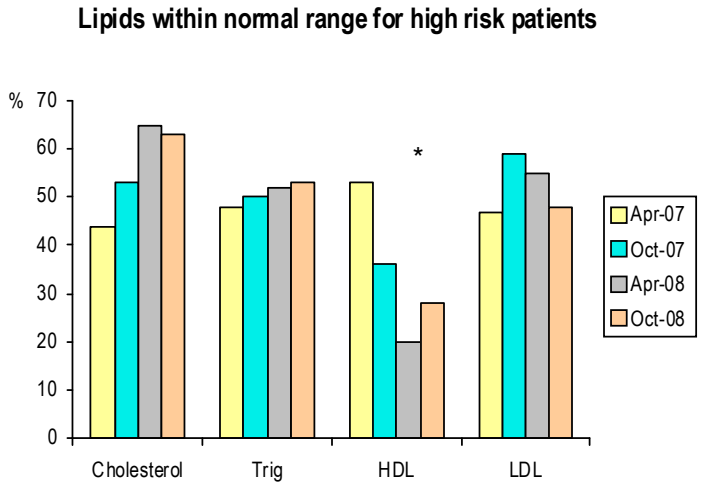
- Haemoglobins <110 g/L are increasing in patients with 'no known CAD'. This result is potentially influenced by patients identified in 2008 with blood disorders resulting in significant anaemia.

HbA1c (Glycosylated Haemoglobin)
Measuring the HbA1c gives an average glucose level of the past 8-12 weeks. October 2008 showed improved glucose control in the diabetics



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 were classified as high-risk in October 2008.

Cholesterol and triglyceride levels have improved in 2008 while HDL and LDL levels deteriorated (significantly in HDL April 08).



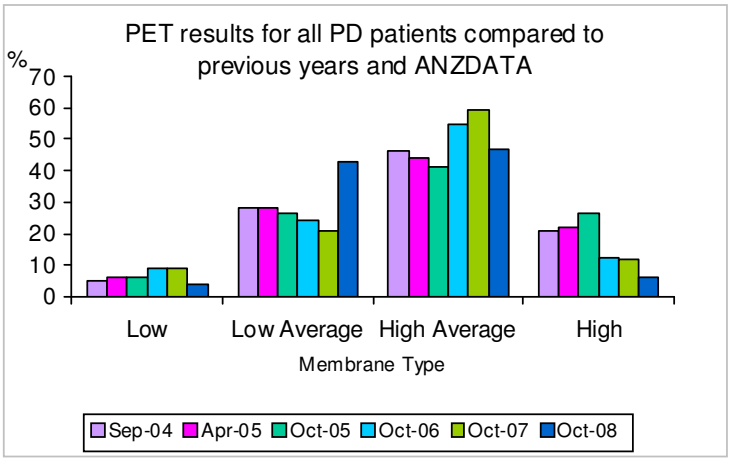
PET (Peritoneal Equilibrium Test) Results

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 were reviewed in 2008. Results showed an increased percentage of patients with low average (LA) membranes. LA membranes transport solutes slower than high or high average membranes but ultrafiltrate well.



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

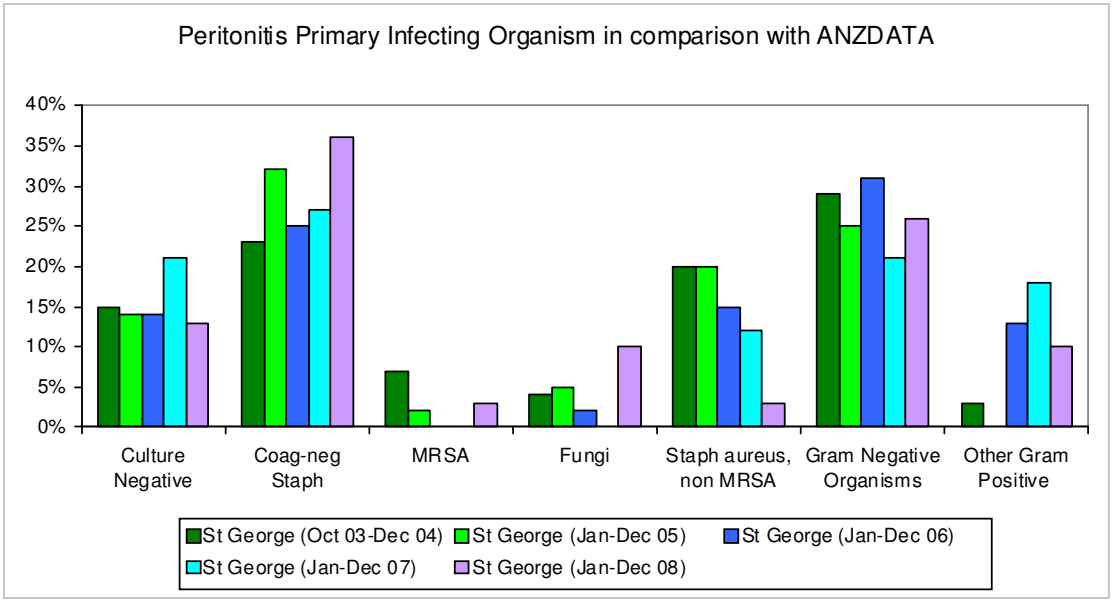
1. Review PD record books for episodes of peritonitis and exit site infections.
2. Review the Poet 2.1 database for episodes.
3. View patient records for admission and treatment information.
4. Peritonitis Episode Forms (ANZDATA) are used to collect information regarding every peritonitis event, to accurately track episodes and treatments. This data is then analyzed using the statistical program Minitab v15.
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 (2008).

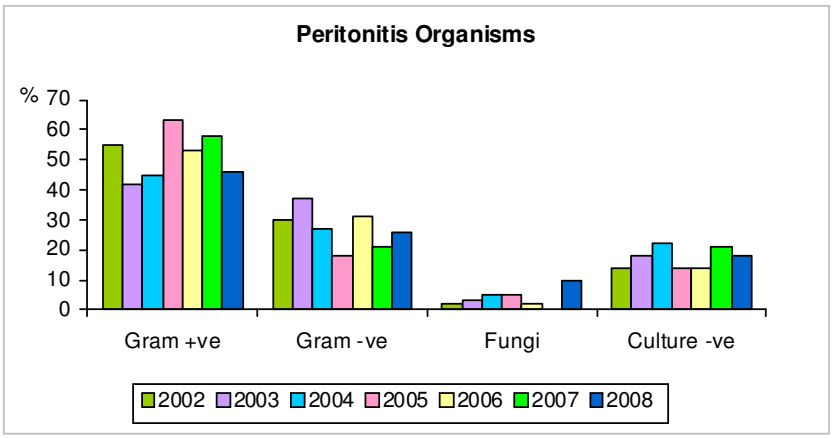
Outcomes

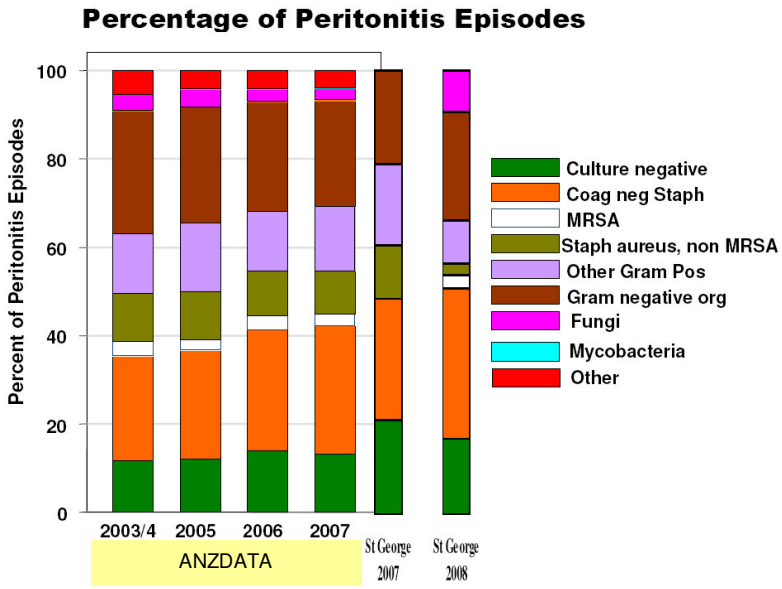
- The rates of infections from 1998 to 2008 continue to show progressive improvement.
- Causative organisms for peritonitis infections show higher fungal and gram negative organisms but less Staph compared to ANZDATA in 2008.

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total patients	72	71	62	79	97	92	74	67	65	74	85
Peritonitis episodes	118	81	69	45	51	62	42	34	40	28	27
Patients with at least 1 episode of peritonitis	n=47	n=42	n=26	n=26	n=37	n=38	n=32	n=31	n=28	n=21	n=22
	65%	59%	42%	33%	38%	41%	43%	46%	43%	28%	26%
Patients with at least 1 episode of Exit site infection	n=39	n=43	n=33	n=21	n=32	n=38	n=14	n=16	n=14	n=12	n=12
	54%	60%	53%	27%	33%	41%	19%	24%	22%	16%	14%

Peritonitis Causative Organisms







Compared to ANZDATA our peritonitis organisms show similar rates for 'culture negative'. There has been an increase in gram-negative organisms and also a sharp increase in fungal infections. Three out of the four fungal infections were in patients who had a multi organism peritonitis. One of these patients died while all others transferred to haemodialysis permanently.

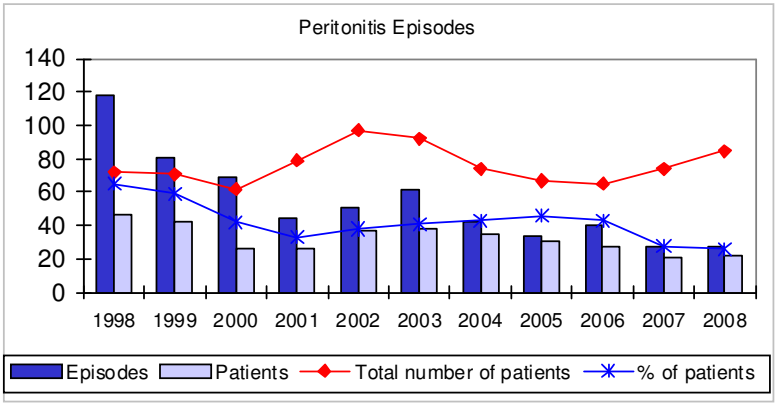
ANZDATA graph from chapter 6 at http://www.anzdata.org.au/v1/report_2008.html

Change of treatment as a result of peritonitis

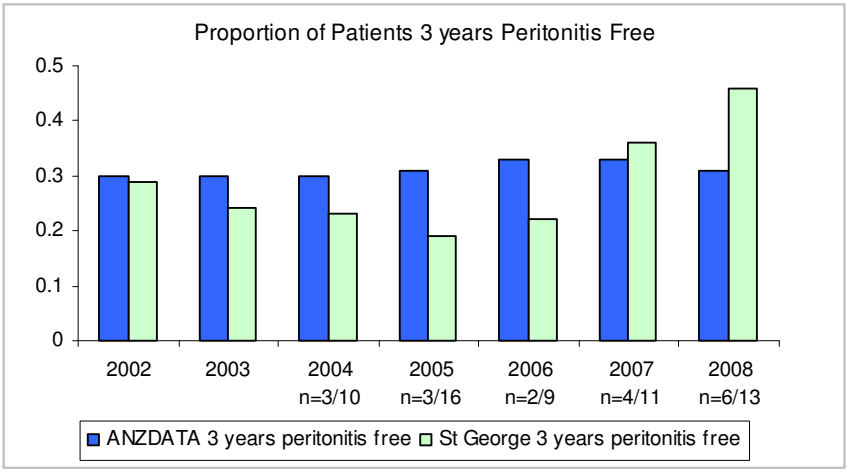
The peritonitis data collected throughout 2008 was analysed through the Minitab v15 statistical program to determine the rate of transfer to haemodialysis *as a direct result of peritonitis*. The results are listed in the following table:

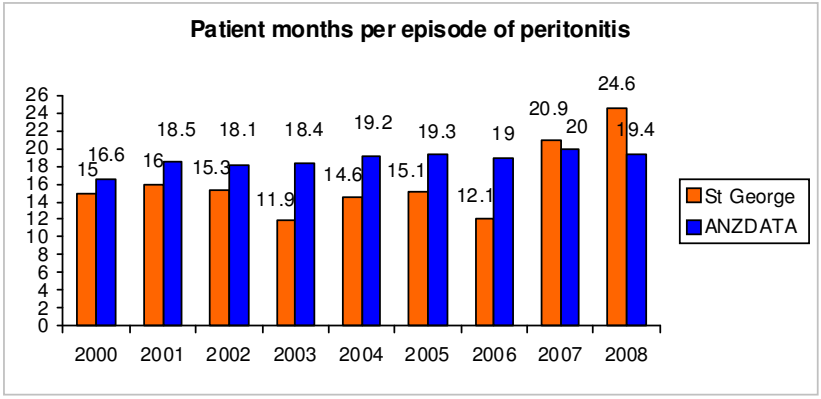
Change in treatment (%)	2005	2006	2007	2008
Interim Haemodialysis	9	9	10	6
Permanent Haemodialysis	11	13	13	18
Catheter removed	20	22	20	24

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 – 2008 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 continued to improve with 46% of patients who have been on dialysis >3 years peritonitis free.





- Patient months per episode of peritonitis compared to ANZDATA Australian results show improvements for the second year in a row, an improvement over and above the ANZDATA result meaning there is a greater length of time to a peritonitis episode. This result may possibly be due to the high percentage of patients using APD.

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 to 1/24.6 months. This betters the benchmark set by the Australian ANZDATA results.
- The percentage of patient's peritonitis free at 3 years has improved to 46%, a 10% improvement from 2007.
- ANZDATA (2008, p. 6.14) reports the most common primary cause of technique failure (ceasing peritoneal dialysis) as 'social reasons' (45%) and infections as the second most common cause (25%). Our primary cause of failure is 'total dialysis failure' originating from blocked catheters, hernias and dialysate leaks. These indicate the repeated surgical interventions our patients have required over 2008.

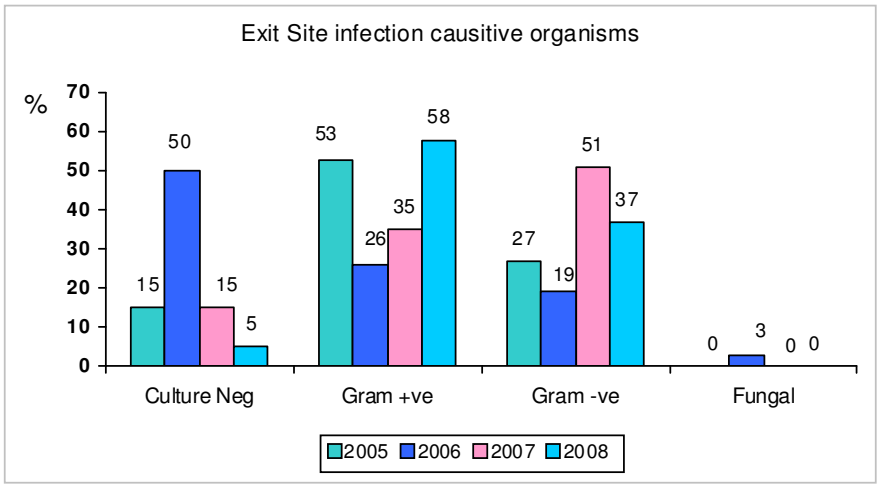
Technique failure

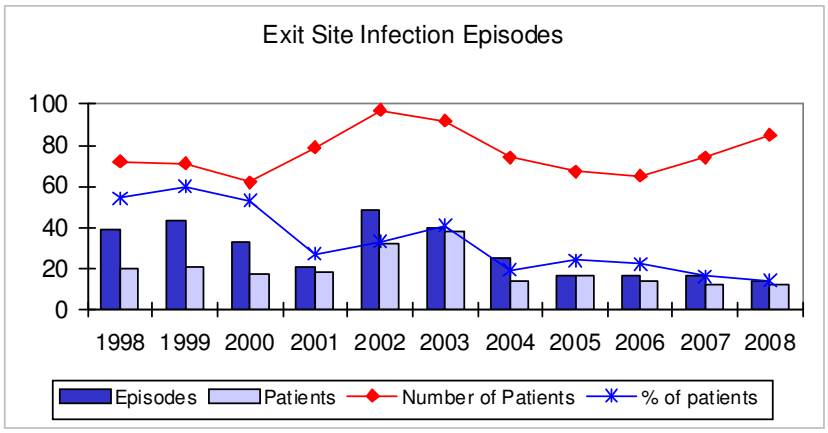
- When a patient changes dialysis modality from peritoneal dialysis to haemodialysis.
- The St George primary reason of technique failure is 'Dialysis Failure' with 65% of transfers to haemodialysis (permanently or temporarily) as a result of dialysate leaks, surgery, inadequate dialysis or mechanical problems. Infective reasons accounted for 25% and total social reasons are 10%.

Primary reason for technique failure	***St George 2007***	***St George 2008***	***ANZDATA 2008***
Infective	36%	25%	25%
Total Dialysis Failure (inadequate dialysis, leaks, surgery, mechanical)	57%	65%	15%
Social (patient choice, failed training)	7%	10%	45%

Exit Site Infections (ESI)

The following graphs represent the exit site swab results from 2005 to 2008 and the numbers of patients / 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. The percent of patients who get ESI has reached a plateau in 2008, but that is despite increased numbers of patients.





- ESI episodes in 2008 is 1/48.1 patient months (2007 was 1/36.5 patient months compared to 1/30.2 patient months in 2006).
- 86% of the total numbers of patients were free from exit site infection in 2008, compared to 84% in 2007 and 82% in 2006.

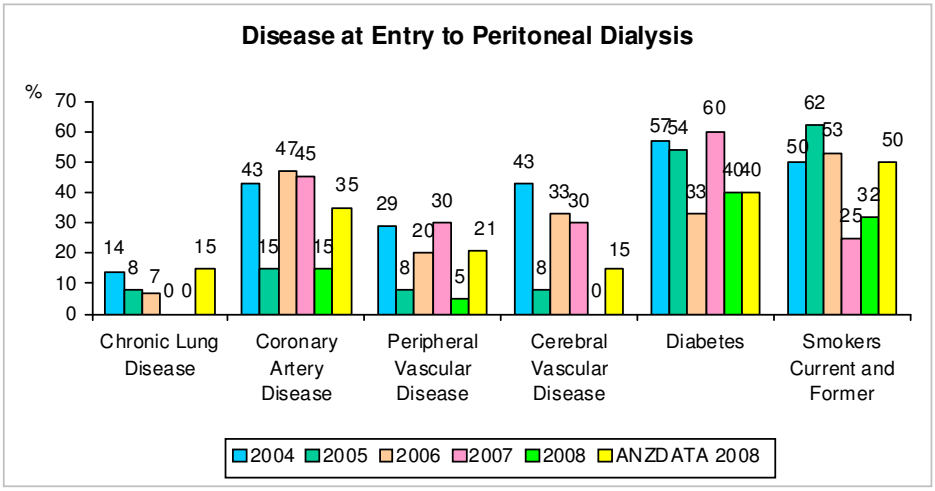
Comments:
ANZDATA does not collect data on Exit Site Infections; therefore there is no Australian benchmark data with which to compare.

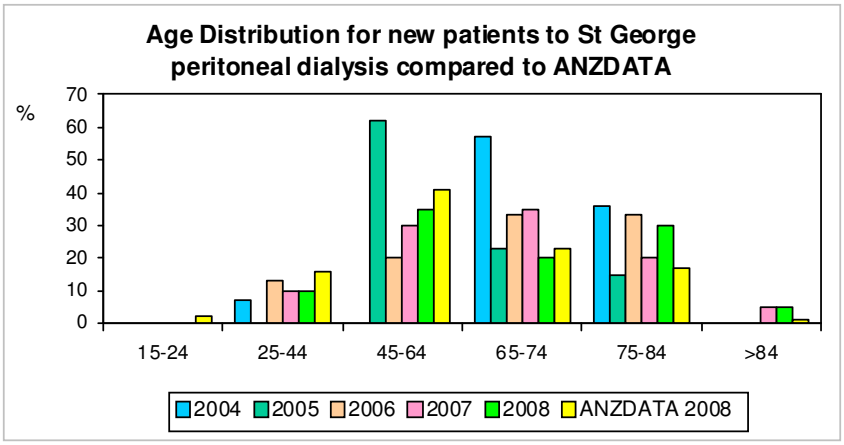
The St George Peritoneal Dialysis Unit uses the Baxter POET computer software to record all swabs taken for analysis from each and every PD patient. The results of all of these swabs can then be graphed using this software. The drawback of this system is the inability to filter this data for actual exit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

Acceptance onto Peritoneal Dialysis

20 new PD patients are included in this data; 10 new PD patients are excluded due to having started renal replacement therapy on haemodialysis or transplant.

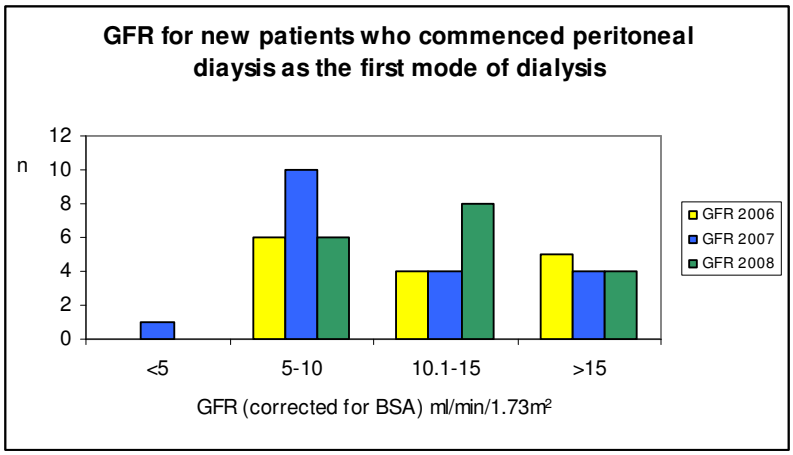
- 2008 had two late referrals to peritoneal dialysis (10%) compared to ANZDATA 2008, 24%.
- Mean age at commencement of PD in 2008 was 66 years.
- 50% were male.





2008 figures show an increase in the percent of 75-84 year olds commencing peritoneal dialysis as their first mode of dialysis which is similar to 2006 and 2004, but is opposite to the ANZDATA 2008 trend which reports a decrease in this age group. The percent of 65-74 year olds has fallen compared to the previous two years which is consistent with ANZDATA 2008 results, while the 15-64 year old and >84 year groups remain largely unchanged (ANZDATA reports an increase in the >84 year age group). St George has a higher percent of elderly patients compared to ANZDATA (new patients to haemodialysis and peritoneal dialysis combined).

Dialysis training is adapted to different learning needs and learning rates of the clients. Some clients require extended training times and extra home support. This has to be taken into consideration when booking new patients in for training so the appropriate time can be allocated. There have been instances in 2008 where clients have ceased PD training and gone to haemodialysis due to the inability to become independent and safe with their treatment despite intensive input and home support.



Glomerular Filtration Rate (GFR)

In 2008 72% of all peritoneal dialysis patients commenced dialysis with a GFR <15 ml/min/1.73m^2.
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 new peritoneal dialysis patients average age has not changed and remains 66 years. There is a decrease in the numbers of patients from non-English speaking backgrounds since 2007 and patients with a BMI >30 have increased for the 3rd year in a row. Co morbidities have reduced in 2008 compared to 2007 with the exception of smoking which has had a 4% increase, but still remains below the Australian average (ANZDATA 2008). See the following tables.

Breakdown of baseline Characteristics of new peritoneal dialysis patients

		St George Total 2007 (n=19*)	St George Total 2008 (n=20*)	ANZDATA 2008
Age	(Average age in years)	66	66	60†
Gender	Male	53%	50%	56%
	Female	47%	50%	44%
Late Referral	(< 3 months before first treatment)	21%	10%	24%
Co-morbidities	Smoking (Current and former)	28%	32%	50%
	Chronic Lung Disease (yes and suspected)	0%	0%	15%
	Cerebrovascular Disease	26%	0%	15%
	Coronary Artery Disease	47%	15%	35%
	Peripheral Vascular Disease	32%	5%	21%
	Diabetes	63%	40%	40%

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

St George Hospital new patients*		2006	2007	2008
Body Mass Index	<20	0%	16%	15%
(kg/m)	20-24	33%	26%	25%
	25-30	47%	37%	25%
	>30	7%	21%	35%
Racial Origin	Caucasoid	93%	60%	85%
	Aboriginal/TSI	0%	0%	0%
	Maori/Pacific Islander	7%	5%	0%
	Chinese	0%	15%	10%
	Indonesian	0%	5%	0%
	Vietnamese	0%	5%	0%
	Other	0%	10%	5%

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

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 commenced in 2008 and requires the staff to contact patients and organise admissions to ambulatory care. Results so far do not show a significant change, but it is anticipated that this will show over time due to the slow process of checking bloods and booking patients into clinic only to have appointments changed when other commitments arise for the patient.

The higher rate of APD in the St George dialysis unit may be an influential factor in maintaining infection rates below that of ANZDATA. APD is not suitable for all patients, but it does offer patients more freedom during the day for normal activities.

The percent of patients transferring to haemodialysis through technical failure (leaks, surgery and mechanical) remains a weakness in 2008. These transfers can be accounted for primarily through dialysate leaks, surgery, inadequate dialysis and mechanical problems.

The rate of failing PD due to social reasons is 35% lower than the rate reported by ANZDATA indicating our patients are suitable for the program and are able to manage their chronic disease effectively. These social failures include patients who were unable to be trained to a point of self sufficiency and required haemodialysis for maintenance dialysis.

The 2007 annual report reported Phosphate as a weakness; this has improved in 2008 and the results are presently better than ANZDATA 2008. Continued education of the patients and staff is important to ensure medications are taken correctly and that patients do not get confused with conflicting information; this is covered by the dietician, but it is important other staff convey the same information.

The increasing age of peritoneal dialysis patients can add to the complexity of training. We have seen some ‘failed training’ in 2008 after extended training times, including outside support from the dialysis companies who have provided ‘in home’ training to extend the training process. This problem is difficult to identify pre tenckhoff insertion and may be difficult to prevent recurring in the future. It is a difficult decision for the patient, family and staff to decide that it is in the patients best interests to transfer to haemodialysis.

Predialysis Clinic Report

Aim

To provide data to the department showing Predialysis 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 Tuesday mornings. 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. A comprehensive letter and assessment is sent to the nephrologist. Patients return to the clinic for follow up at 4-6 weeks and yearly or 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.

2008 data

In 2008 there were 41 new attendees to the clinic: 27 males and 14 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 2008 is 68 years which is the highest since the clinic started (see figure 3).
Attendances by physician were; Prof Brown 9, Dr Chan 3, Prof Kelly 11, Prof Mangos 13, Dr Luxton 2 and Dr Trew and Dr Lane 2 (see figure 4). There were 14 return visits to the clinic for 2008.

Of the 41 new patients seen in 2008; three patients have actively sought a non-dialysis pathway, four commenced peritoneal dialysis and three commenced hospital haemodialysis. The remaining 31 patients remain active on the Predialysis Clinic pathway.

Of the 32 ESRF patients who commenced haemodialysis in 2008, 11 had attended the clinic pre dialysis. 22 of the 24 patients who started peritoneal dialysis as the first dialysis therapy had been to the clinic for education and assessment.

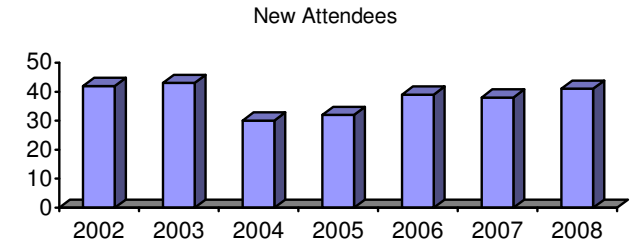


Figure 1

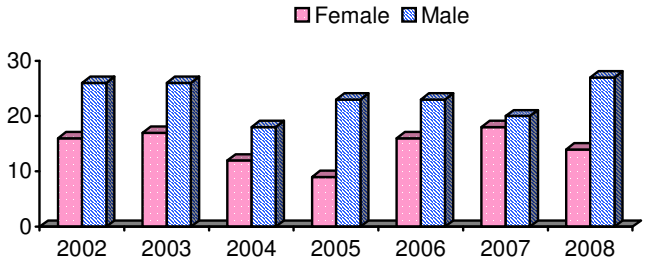


Figure 2

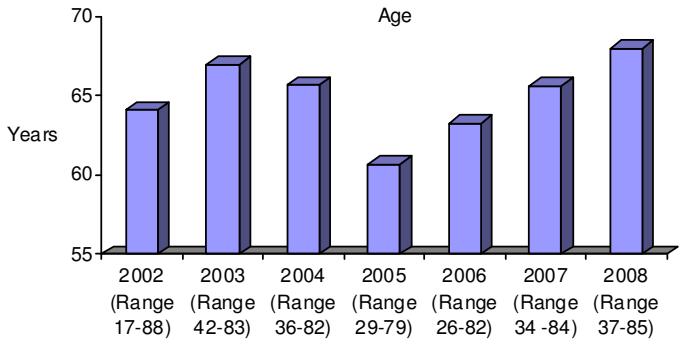


Figure 3

Figure 1: represents the number of new attendees each year. A total of 265 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 2008 is from 37-85years of age.
Figure 4: Attendance at clinic by physician

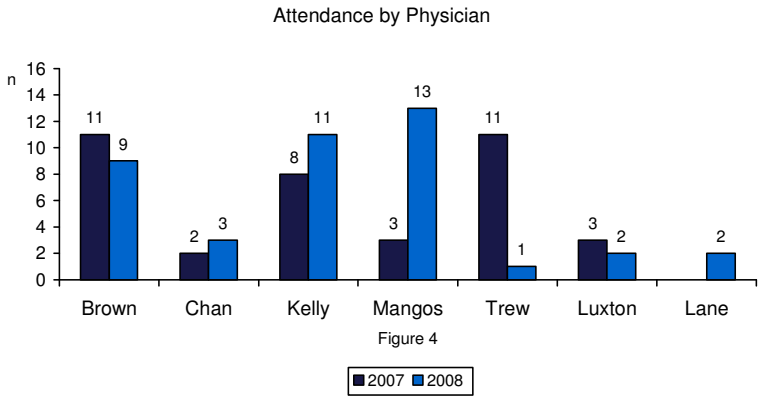


Figure 4

Figure 4

Figure 5: The GFR on referral to the clinic for the 41 new patients in 2008.

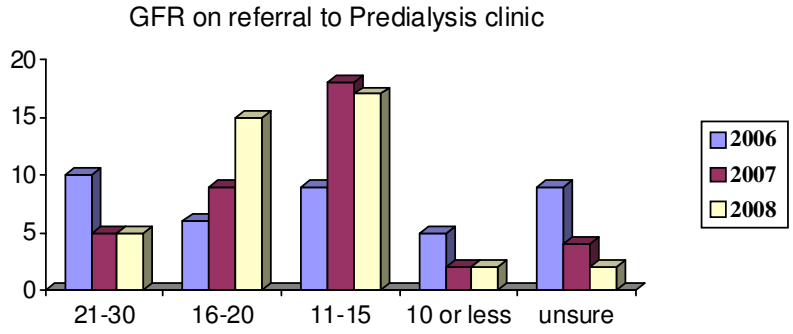


Figure 5

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 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.
2. A comprehensive social work assessment has been developed and this will utilised for clinics in 2009.
3. The commencement of the Renal Palliative Care clinic in 2009 will assist elderly frail patients who attend the Predialysis Clinic in their decision making and support those who choose a non dialysis pathway.

Review

The Predialysis Clinic data will be reviewed again in January 2010 in preparation for the annual report. The next presentation of this topic to the department will be late 2009.

[1] ANZDATA 27th annual report

RENAL NUTRITION

Ongoing QI activities performed by the renal dietitians in year 2008 included:

A. Dialysis nutrition assessment and dialysis adequacy
B. Pre-dialysis clinic evaluation – Nutrition component
C. Phosphate management in haemodialysis patients
D. Development of the Nutritional Management Guidelines for Adult Renal Transplant Recipients (GMCT project)

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

A Dialysis nutrition assessment and dialysis adequacy

Summary: Dialysis patients of SGH receive regular nutritional assessment by dietitians using criteria as recommended by the CARI and DAA (Dietitian Association of Australia, Renal Taskforce) 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 2008, at the time of the unit's dialysis adequacy studies/audit of biochemical and haematological targets. Majority of patients received appropriate interventions.
Plan: (1) To continue with current activities, (2) to identify KPIs and to audit outcome of interventions

B Pre-dialysis assessment clinic:

Summary: 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 and follow up program. Data of the evaluation of pre-dialysis assessment clinic – nutrition component and nutrition characteristics for the period of 4/2002 to 4/2008 was presented at the ANZSN ASM 2008.
Plan: (1) To continue with current activities, (2) to identify KPIs and to audit outcome of interventions

C Phosphate management in haemodialysis patients:

Background: hyperphosphatemia and achieving optimal control remain the major challenges to our dialysis patients. A multi-disciplinary phosphate management working party was formed in March 2008. It includes the dietitians, CNC, RNs, MO and the pharmacist.
Aim: To evaluate the nutrition and practical aspects of phosphate management
Methods:

1. Patients were asked to complete a questionnaire to evaluate their knowledge and practice.
2. In focus groups, nurses were asked to identify issues affecting phosphate management and strategies for improvement.
3. A survey of current practices was conducted to the nursing unit managers of all New South Wales (NSW) dialysis units.

Results:

- 45.7% (67/142) of patients had fasting serum phosphate >1.6mmol/l and 42.2% Ca-P >4
- 60% (n=85) completed the knowledge questionnaire. Mean knowledge score was 11.6±6 out of 30 for rating food items with high or low phosphorous content correctly. It has no significant correlation with the general phosphate management knowledge scores(r=0.04, *p*=0.72).
- Patients "reported of" taking phosphate binders with meals (82%) and snacks(32%).
- **In a random audit,** 107 of the 142 patients were prescribed phosphate binders, only 25(23.4%) brought in their binders to the HD session and took them with meals. For those did not bring in the binders, nearly all misinterpreted doctors' instructions and drug labels regarding "meals" vs "snacks".
- Nursing survey identified patient education, constant reminder and protocol re-enforcement were the keys to better management.
- 83% (45/54) dialysis units in NSW responded to the survey. 97.8% (44/45) monitored phosphate monthly and 93% (42/45) required patients to bring in own binders for their meals at HD sessions.

Conclusions: this study identified a number of practical issues for the multidisciplinary team to address for better phosphate management.
Action: to formulate and to implement integrated strategies in phosphate management.

D. <u>Nutrition Management Guidelines for Adult Renal Transplant Recipients:</u>

Background: The literature reports high prevalence of post transplant abnormalities, such as increase in body weight (10%-35%), high cholesterol (30-60%), high triglycerides(20-35%), hypertension, decrease in bone mineral density (60%) and up to 20% develop diabetes. Similar pattern has been observed in our transplant population. By June, 2006, after searching all the scientific literature, <u>NO</u> comprehensive nutrition guideline for renal transplant recipients has been developed or available
Aim: to develop evidence based nutrition guidelines for endorsement by CARI and DAA (Dietitians Association of Australia) as part of the GMCT project initiatives by the transplant nutrition working group, including the senior renal dietitian (MC), SGH as chair of the steering committee.
Methods & Results: see publication: Development of Evidence-Based Guidelines for the Nutritional Management of Adult Kidney Transplant Recipients. Journal of Renal Nutrition 2009;(19)1:101-104
Action: (1)To develop management protocols for SGH, (2)To identify KPIs and to adit outcome of interventions

Report by: Maria Chan, Senior Renal Dietitian

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