National Renal Advisory Board

New Zealand

Dialysis and Transplantation Audit

2010

Report for New Zealand Nephrology Services on behalf of the National Renal Advisory Board

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Standards and Audit Subcommittee

July 2012

Establishment of a national quality assurance framework to improve the delivery of dialysis services to the New Zealand dialysis population.

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Executive Summary

- The incidence of treated end-stage kidney disease in 2010 was 115 per million population (pmp), which is similar to that seen in recent years, with the exception of 2009 where it peaked at 135 pmp. The highest incidence was seen at Middlemore (212 pmp) and the lowest at Christchurch (47 pmp).
- Dialysis prevalence however continues to increase to 544 pmp in 2010, ranging from 1014 pmp at Middlemore to just 206 pmp at Christchurch. The Auckland, Middlemore and Waikato units showed the greatest increase in dialysis numbers.
- The prevalent dialysis modality has changed little in recent years, with peritoneal dialysis (PD) usage ranging from 22% at Palmerston North to 53% at Waikato (national average 35%). Home haemodialysis usage ranges from 10% in Hawke's Bay and Taranaki to 41% and 44% in Christchurch and Dunedin respectively (national average 18%).
- Most units now meet the standard of > 70% prevalent haemodialysis (HD) patients using permanent vascular access, although there has been no improvement in recent years. Catheter usage remains > 20% nationally with only Taranaki and Dunedin achieving less that 10% catheter use.
- Preparation for HD has declined with no unit currently meeting the standards for use of permanent vascular access at first dialysis.
- Similarly the preparation for PD has declined with now 20% of non-late start patients established on PD at 90 days requiring initiation of dialysis with HD. These data indicate slippage in the capacity of units to adequately prepare patients for dialysis.

- High numbers of HD patients are receiving less than 4.5 hours per dialysis session and this is reflected by reduced dialysis adequacy measures in these units. There are increasing numbers of patients receiving more than 3 HD sessions per week, but this is almost entirely at Christchurch and Dunedin.
- There remains considerable variation in the management of erythropoietin to maintain haemoglobin (Hb) concentrations between 100-130 g/L. Many patients with Hb > 130 g/L continue to have erythropoietin administered, with both safety and cost implications. Taranaki appears to have the tightest control of its erythropoietin use.
- 2010 saw the lowest transplantation rates for 5 years with only 108 transplants nationally, of which 56% were live donor transplants. There is marked variation in live donor rates across units. Even when patients are listed on the national deceased donor waiting list there is significant variation in transplantation rates, for reasons that are not easily explained.

If it is accepted that the above standards are reflective of best practice dialysis care then there has been minimal improvement in most standards over the last 5 years, with considerable variation between units. This suggests that many renal services are constrained in their capacity to deliver optimal dialysis care for their population. Specific service improvement work is warranted aimed at the achievement of these standards and should be prioritised particularly in units where performance has trended downwards in recent years.

Further analysis of the differences between units, particularly with regard to transplantation rates is warranted.

Introduction

The National Renal Advisory Board (NRAB) presents its seventh annual audit report of the New Zealand dialysis and transplantation care standards. This data is predominantly derived from the annual return to the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA), but also includes specific data sets provided by individual renal services. The New Zealand Peritoneal Dialysis (NZPD) registry is currently undergoing a major overhaul, and it has not been possible to include any data analysis with regard to peritoneal dialysis. It is expected that future reports will be able to include more complete data from the NZPD registry. Once again comparative data relating to transplantation rates has been reported.

For the first time data is presented for the renal service at Waitemata DHB, which at the end of 2010 had taken over care of patients dialysing at the Waitakere haemodialysis satellite facility. For all other comparisons Waitemata remains included with the Auckland data but future reports will separate the two services completely.

The collection and collation of data for this report is critically dependent on the goodwill and hard work of renal units and the staff of the ANZDATA and NZPD Registries. The dialysis care standards have been appended to the Tier Two Renal Service Specifications in the Ministry of Health's National Service Framework library. The standards are also available for review by health professionals and the public on the Kidney Health New Zealand website http://www.kidneys.co.nz/.

The process of data collection

The 2010 Report includes data from the 2010 ANZDATA Registry Report, for the calendar year ending 31 December 2010, and individual renal units' audit programmes. The timing of data collection and reporting from ANZDATA means that the New Zealand Audit Report cannot be distributed until their work is completed and this has led to some delay in the delivery of this report.

The audit data is shown in tabular and graphic form in the following pages. There may be minor changes in the data from previous years which result from corrections and updates to the ANZDATA and NZPD databases. The raw data has not been included but is available to Heads of Renal departments on request.

The National Renal Advisory Board would appreciate feedback on this report. Comments can be sent to Mark Marshall, Chair of NRAB MRMarshall@middlemore.co.nz , or Grant Pidgeon grant.pidgeon@ccdhb.org.nz .

Table1 Demographic data

Renal Service Demographic Data 2010											
	Whangarei	Auckland	Middlemore	Waikato	Hawke's Bay	Palm Nth	Taranaki	Wellington	Christchurch	Dunedin	New Zealand
Population*	157,800	988,650	490,350	725,865	155,270	231,830	109,530	615,580	596,125	302,530	**4,373,530**
% Maori	31.9%	9.0%	16.8%	26.0%	24.8%	20.4%	16.8%	12.3%	8.0%	8.8%	**15.2%**
% Pacific	1.6%	9.1%	22.1%	2.1%	3.2%	2.2%	1.0%	5.8%	2.0%	1.5%	**6.4%**
% Asian	2.0%	21.7%	19.8%	4.6%	2.5%	4.2%	2.6%	7.8%	6.5%	3.8%	**10.6%**
% Other	64.6%	60.2%	41.4%	67.3%	69.5%	73.2%	79.5%	74.1%	83.5%	85.9%	**67.8%**
Age 0-29yr	38.9%	42.7%	47.1%	41.6%	40.0%	41.5%	39.3%	40.5%	39.0%	40.4%	**41.6%**
Age 30-49yr	24.8%	30.3%	27.7%	26.0%	25.9%	24.8%	26.0%	28.6%	27.7%	26.3%	**27.7%**
Age 50-69yr	25.6%	19.7%	19.0%	22.5%	23.7%	22.7%	23.4%	22.0%	23.0%	23.1%	**21.7%**
Age 70+	10.7%	7.3%	6.2%	9.9%	10.3%	10.9%	11.2%	8.9%	10.3%	10.2%	**9.0%**
Incident numbers	15	99	104	128	17	30	13	51	28	18	**503**
Incidence rate (pmp)	95	100	212	176	109	129	119	83	47	59	**115**
Prevalent numbers (dialysis)	149	570	497	475	86	115	60	212	123	91	**2378**
Prevalence rate (pmp)	944	577	1014	654	554	496	548	344	206	301	**544**

* Estimate from 2006 census (Ministry of Health)   pmp – per million population

Incidence – number of new patients commencing renal replacement treatment (dialysis or pre-emptive transplant) during the calendar year
Prevalence – number of patients receiving dialysis treatment at the end of the calendar year i.e. 31 December 2010

Unit Coverage

Whangarei	Northland DHB
Auckland	Waitemata and Auckland DHBs
Middlemore	Counties Manakau DHB
Waikato	Waikato, Bay of Plenty, Lakes and Tarawhiti DHBs
Hawke's Bay	Hawke's Bay DHB
Palmerston North	Whanganui and MidCentral DHBs
Taranaki	Taranaki DHB
Wellington	Capital & Coast, Hutt Valley, Wairarapa and Nelson Marlborough DHBs
Christchurch	Canterbury, West Coast, and South Canterbury DHBs
Dunedin	Otago and Southland DHBs

Demography

- In 2010 503 patients commenced renal replacement therapy (RRT) in New Zealand, giving an incidence of 115 per million population (pmp) (Table 1). This is similar to incidence rates over recent years with the exception of 2009 where 583 patients commenced RRT (incidence rate of 135 pmp).
- Incidence rates in 2010 continue to vary markedly across the country from a high of 212 pmp at Middlemore to just 47 pmp in Christchurch (Table 1).
- There are considerable demographic differences in the populations served by the various renal units. Whangarei, Waikato and Hawke's Bay services have the highest percentage of Maori at 25-32%, whereas the Middlemore unit has a greatly increased number of Pacific people at 22% (national mean only 6.4%). There is considerably less variation in the age structure of the populations of the various renal units (Table 1).
- Although the overall national incidence rate of RRT fell in 2010 back to previous stable levels, the prevalence of patients dependent on dialysis continues to rise (Table 1). The dialysis prevalence at the end of 2010 was 544 pmp, an increase of 3.8% compared to 2009, although absolute dialysis numbers increased by 5.2%. The overall prevalence of RRT (dialysis and transplant) increased in 2010 by 4.8% (Fig. 1).
- Prevalence rates also vary considerably and are highest in those units serving populations with high percentages of Maori and Pacific people.

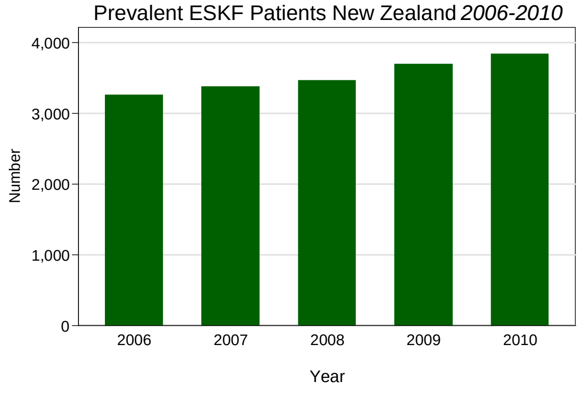

Fig.1 Prevalence of ESKF (dialysis and transplant) by year

- Most units had similar prevalent numbers of patients (dialysis and transplant) compared to 2009, with most of the growth seen in the Auckland, Middlemore and Waikato units (Fig. 2).

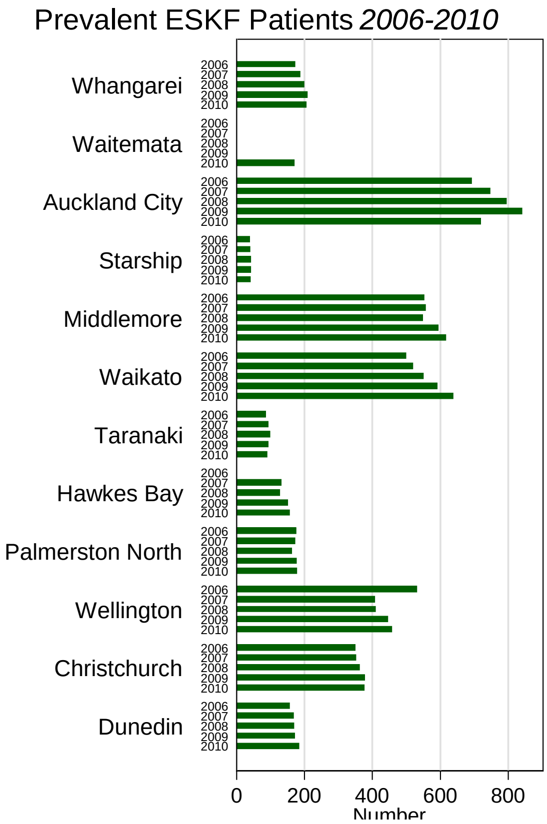

Fig. 2 Total ESKF prevalence (dialysis & transplant)

Dialysis Modality

- In 2010 there were only 16 pre-emptive transplants performed (3.1% of incident patients) (Fig. 3).

- Of patients commencing dialysis in 2010 67% initially received some form of haemodialysis, compared to 61% in 2009. This varied from only 50% in Christchurch to 87% in Palmerston North. Starship Hospital commenced 4 of its 5 new dialysis patients on PD (Fig. 3).

- Prevalent modality continues to show marked regional variation (Fig. 4). The prevalence of peritoneal dialysis across NZ has changed minimally, and

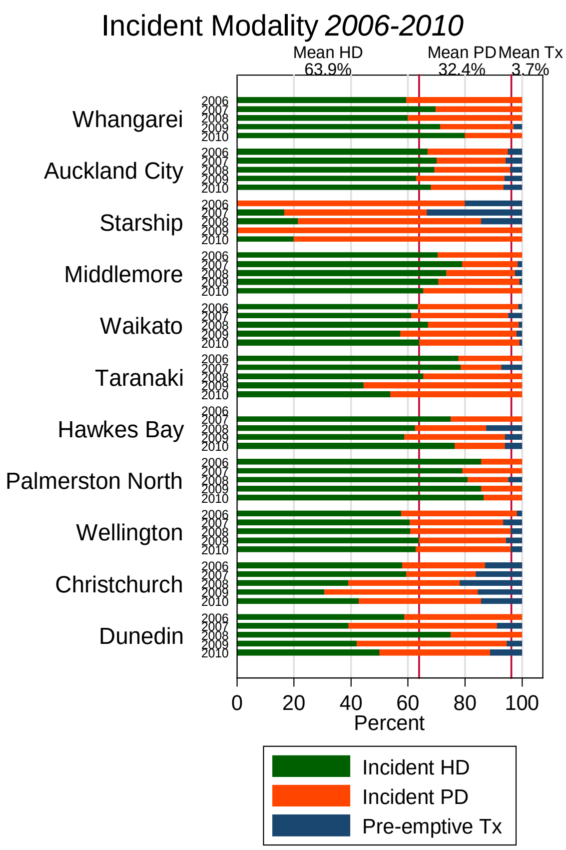

Fig.3 Modality used by incident patients

remains at 35% of all dialysis patients, although ranges from 53% in Waikato to just 22% in Palmerston North. The number of patients performing home haemodialysis continues to increase and is now 17.7% of prevalent patients (Fig. 4), ranging from 44% in Dunedin to just 10% in Hawke's Bay and Taranaki.

- The use of automated peritoneal dialysis (APD) has again increased slightly to 43% of all PD patients but continues to show marked variation across units (Fig. 4).

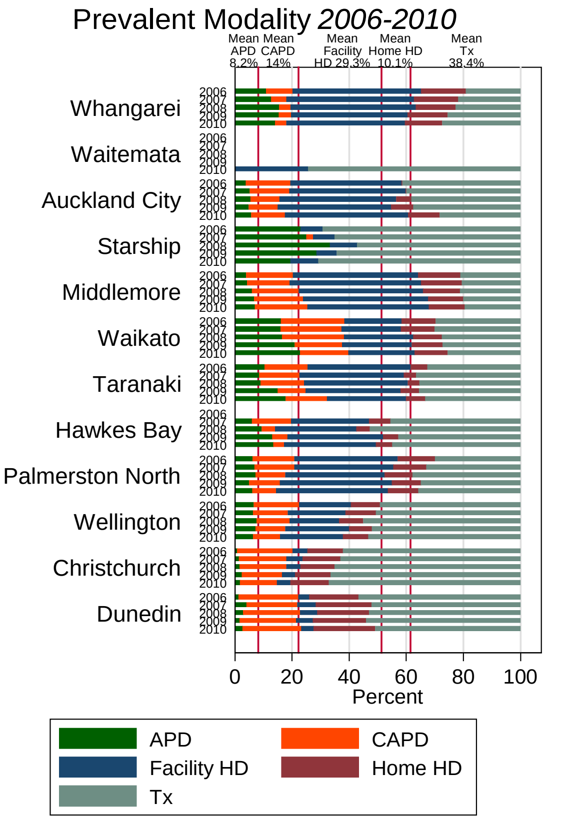

Fig.4 Modality used by prevalent patients at end of year period

Vascular access for haemodialysis

- All but one unit now achieves the standard for optimal vascular access (arteriovenous (AV) fistula or graft) for prevalent patients (> 70% of patients) (Fig. 5). There has been little improvement over the last few years with some units showing deterioration in the achievement of this standard. This is most marked for Palmerston

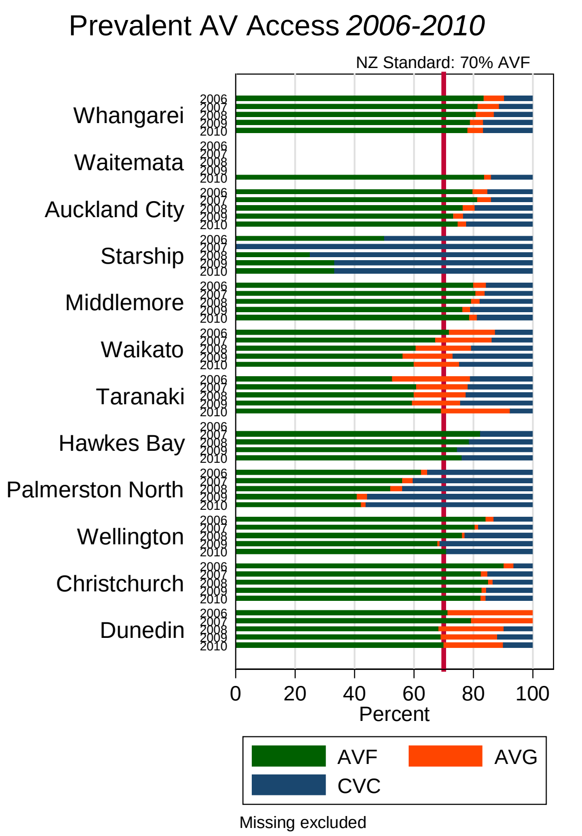

Fig. 5 AV access used by prevalent haemodialysis patients at end of year

North where only 44% of prevalent haemodialysis patients are dialysing via permanent AV access, and Wellington, which only just achieves the standard at 71%.

- There remains marked variation in the use of AV grafts for permanent vascular access with only Waikato, Taranaki and Dunedin units employing grafts to any significant degree.
- Catheter use for HD remains high at 23% nationally, ranging from 56% at Palmerston North to 8% at Taranaki. Only two units, Taranaki and Dunedin, achieve the 10% standard of catheter use for prevalent HD patients, which is an improvement on 2009 when no unit achieved this standard (Fig. 6). Notably both these units are higher users of AV grafts.

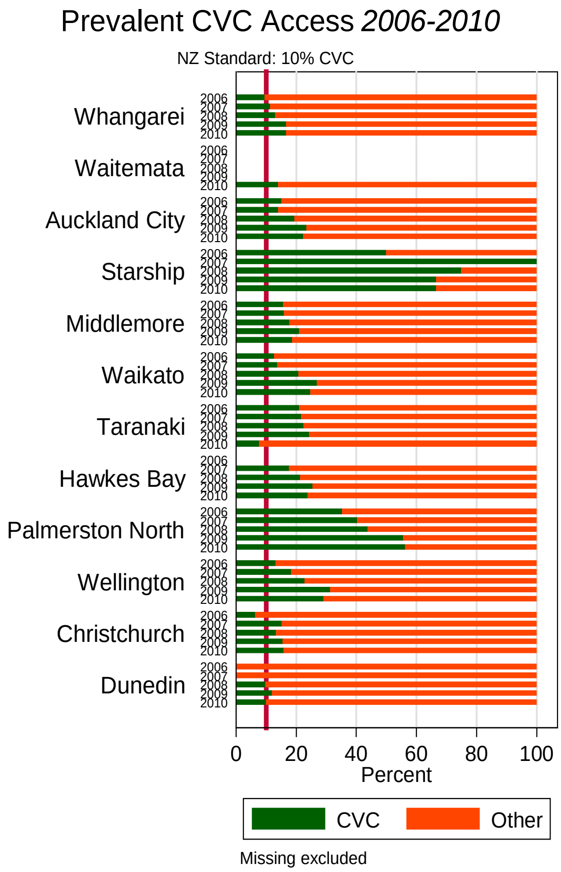

Fig. 6 Use of catheters for AV access in prevalent patients at end of year

- Unfortunately the commencement of HD with permanent access has declined with no unit currently meeting the standard of 80% for non-late referred patients (Figs. 7 & 8). Nationally only 32% of such patients commence dialysis with permanent access, ranging from 25% in Hawkes Bay and Northland to 60% in Dunedin. It should be noted that numbers of such patients are low in the smaller services leading to marked year to year variation in the achievement of this standard.

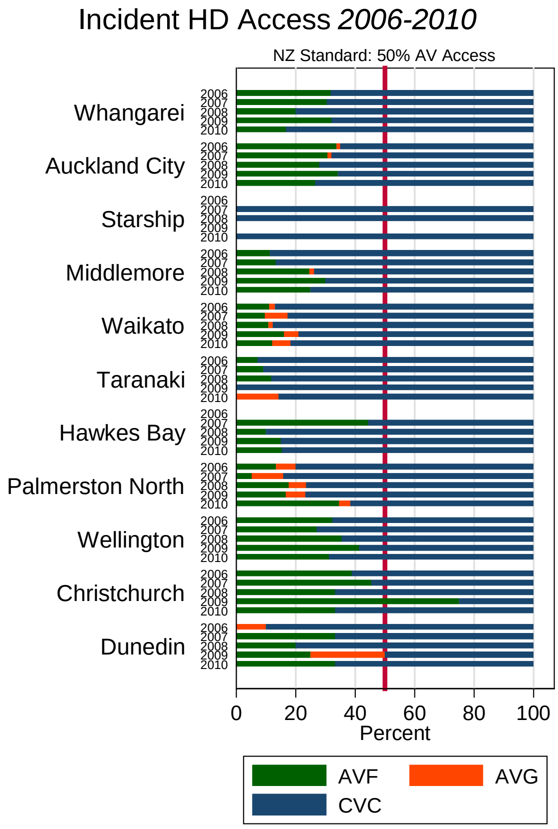

Fig. 7 AV access used for 1st haemodialysis

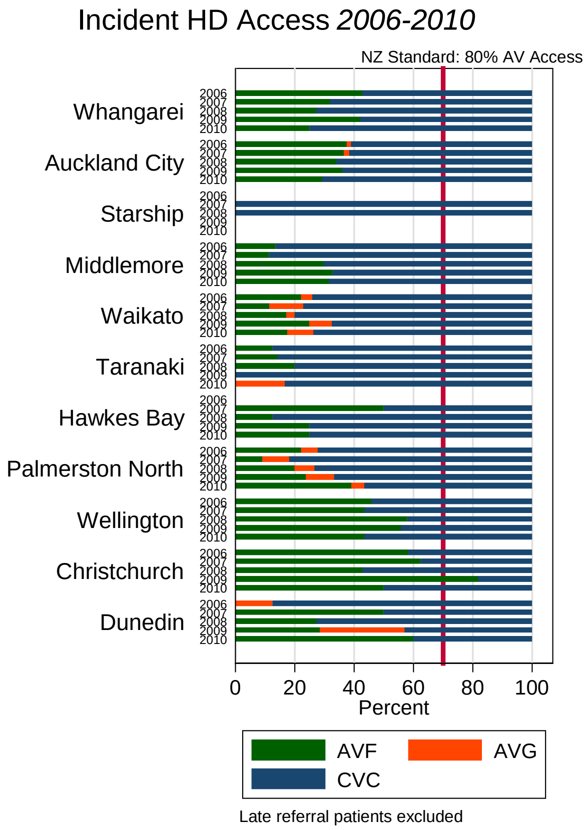

Fig. 8 AV access used for 1st haemodialysis in non-late referred patients

- All units, except Christchurch, are now regularly reporting catheter associated bloodstream infection (CABSI) rates and all exhibit rates well under the international standard of 4 episodes per 1000 catheter days, ranging from 0.69 in Whangarei to 2.26 in Waikato. However given the high catheter usage rates this still reflects considerable morbidity (Fig. 9).

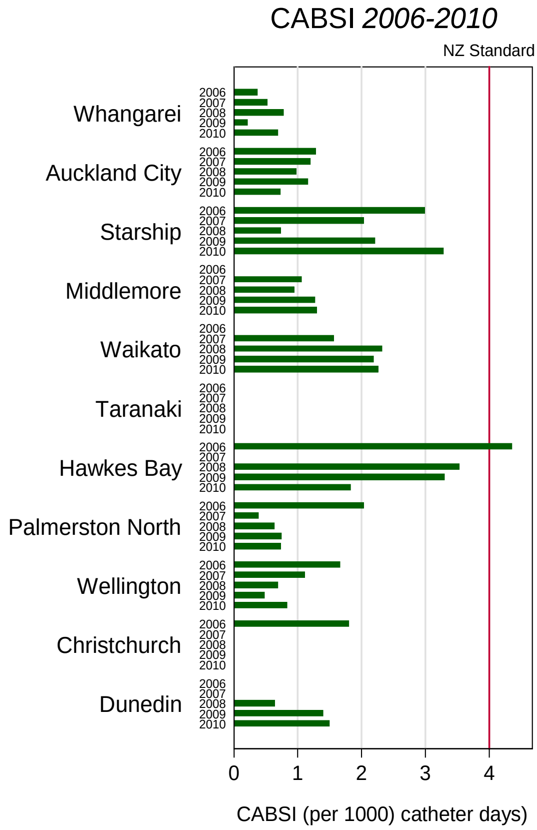

Fig. 9 Catheter associated bloodstream (CABSI) rates (per 1000 catheter days)

Peritoneal dialysis (PD)

- As mentioned above there has been little change in the percentage of prevalent patients using PD, and a slight increase in the use of APD (Figs. 3 & 4).
- There has been a slight deterioration in the percentage of non-late start patients transferring to PD after beginning dialysis with HD (usually using a CVC) (Fig. 10). Nationally this was 20% of all non-late start patients established on PD by 90 days,

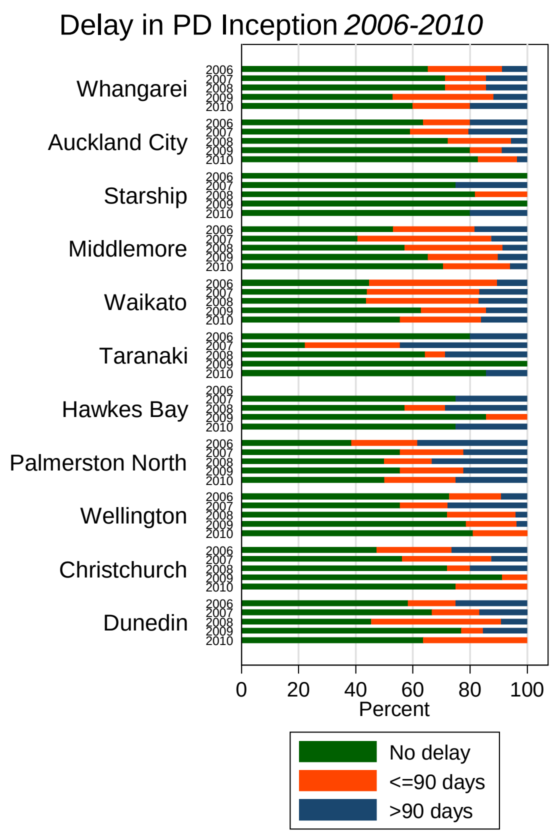

Fig.10 Delay in PD commencement with initial period of HD in non-late start patients

compared with 17% in 2009. This ranged from 0 patients in Taranaki, Hawke's Bay and Starship to 33% in Palmerston North, 29% in Waikato and 25% in Whangarei. This may be a reflection of pre-dialysis planning and access to timely placement of PD access, although it is not clear from ANZDATA whether all such patients had chosen PD in the pre-dialysis period. Again it should be noted that low numbers in the smaller units can lead to marked variation.

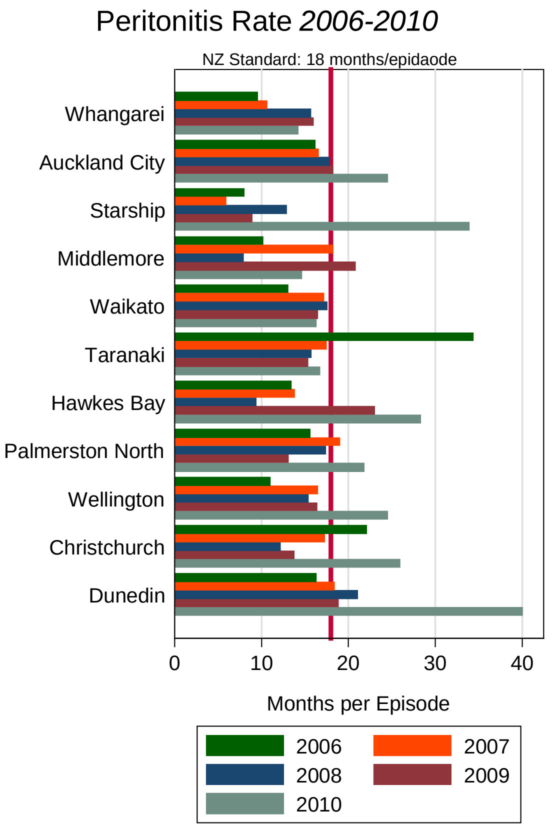

Fig.11 Peritonitis rates (months per episode of peritonitis)

- Peritonitis rates reported to ANZDATA show considerable improvement in 2010 for many services (Fig. 11). 7 services currently achieve the standard of greater than 18 months PD per episode of peritonitis, with Dunedin improving to 40 months per episode.

Haemodialysis adequacy, frequency and duration of treatment

- The number of haemodialysis patients receiving less than 4.5 hours dialysis per session has remained the same at 41% in 2010, ranging from just 15% in Wellington to 58% in Auckland (Fig. 12).

- Only a few patients receive less than 3 sessions per week, whereas the number receiving more than 3 sessions per week continues to increase, reaching 11.8% in 2010.

  There remains considerable variation with 42% of Christchurch patients receiving more than 3 sessions per week but only 2% of Palmerston North patients (Fig. 13.).

- Various markers of haemodialysis adequacy are used by dialysis services, predominantly the urea reduction ratio (URR) and Kt/V. The URR can be converted to Kt/V and a composite analysis of haemodialysis

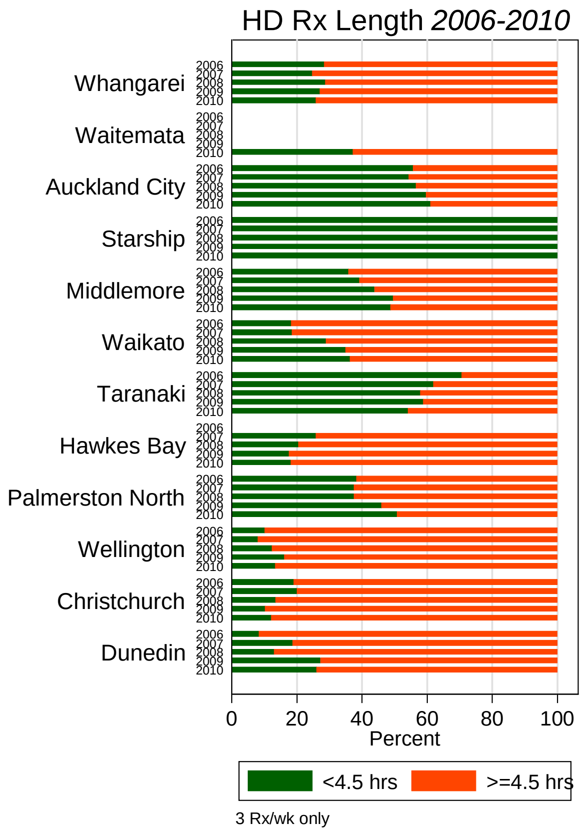

Fig. 12 Duration of HD session

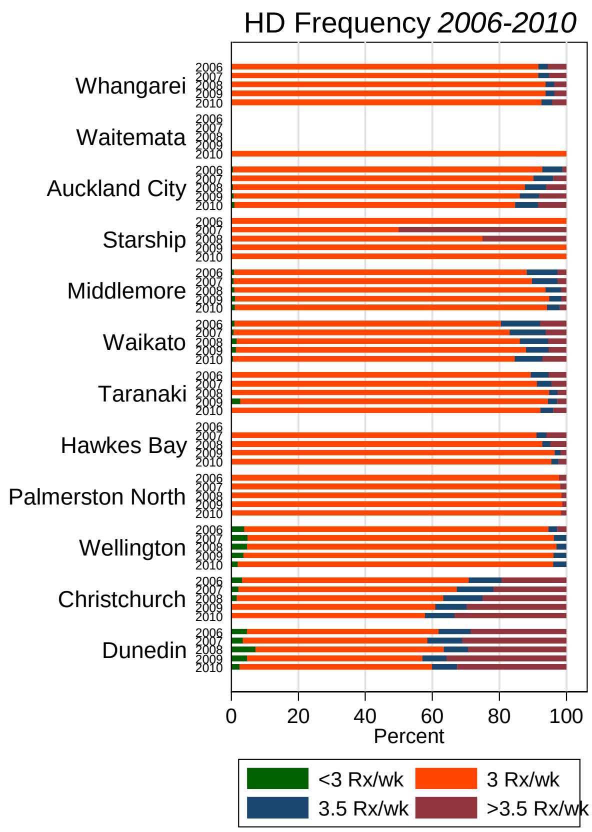

Fig. 13 Frequency of HD sessions per week

adequacy is given in Figure 14. A Kt/V of less than 1.2 is generally held to reflect under-dialysis, although this remains controversial and some units choose not to report adequacy at all.

- Units reporting lower adequacy data tend to be the same units with high numbers of patients performing shortened dialysis, with the exception of Northland which has good adequacy data despite 25% of patients receiving less than 4.5 hours per dialysis session.
- The amount of missing data reflects both unit preference as well as the difficulty in obtaining results from home-based haemodialysis patients.

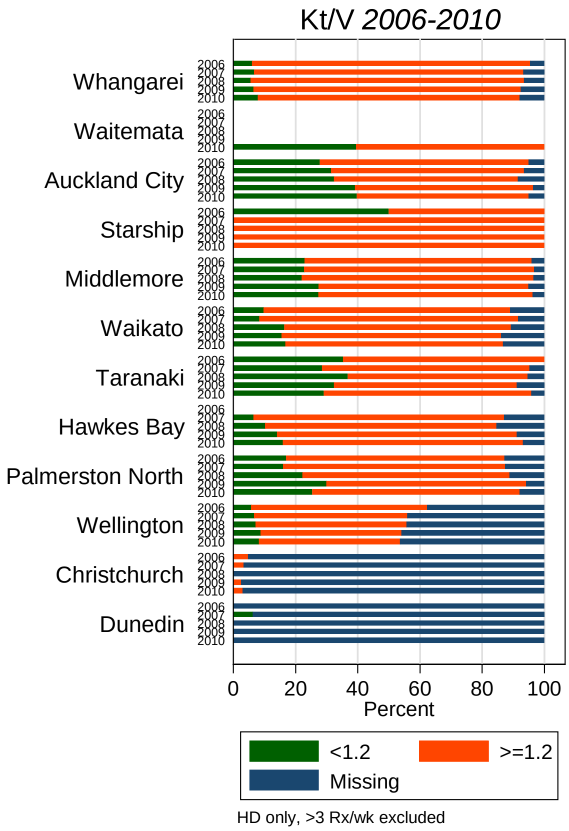

Fig. 14 Dialysis adequacy (URR converted to equivalent Kt/V value)

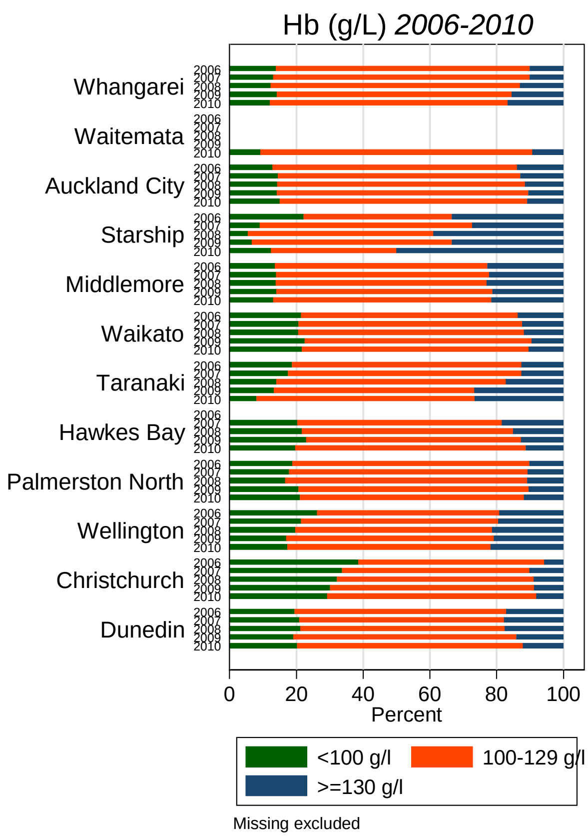

Fig. 15 Haemoglobin concentrations for all prevalent dialysis patients

Anaemia management

- It is increasingly accepted that raising haemoglobin (Hb) concentrations too high with erythropoietin (EPO) can be hazardous, and consequently most international guidelines have recently revised their Hb targets to 100-120g/L.

Some commentators believe this to be too tight a guideline. For the purposes of this report, data is presented for all prevalent dialysis patients with Hb concentrations less than 100g/L and for those receiving EPO therapy with Hb concentrations greater than 130g/L (Figs. 15-17).

- At the end of 2010 17% of NZ dialysis patients had Hb concentrations less than 100g/L, ranging from just 8% in Taranaki to 29% in Christchurch (Fig. 15).
- Of patients with Hb < 100 g/L the majority were receiving EPO except in Christchurch (20% not on EPO) (Fig. 16).
- By contrast 11% of patients receiving EPO have Hb concentrations > 130g/L unchanged from 2009. Figure 17 shows that of all patients with Hb > 130 g/L up to 80% in some units, continue to be administered EPO. The lowest rates are seen in Christchurch and Taranaki.
- Taken together these data indicate

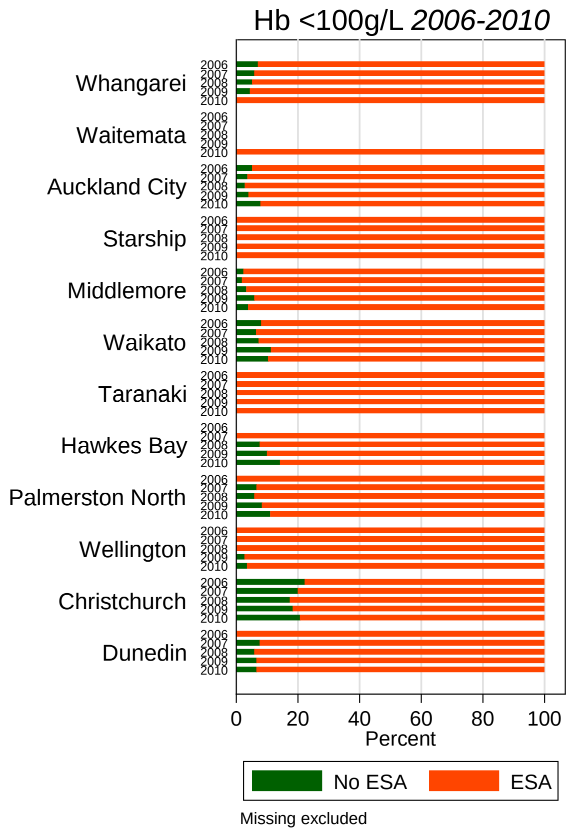

Fig. 16 Haemoglobin concentrations less than 100g/L in dialysis patients

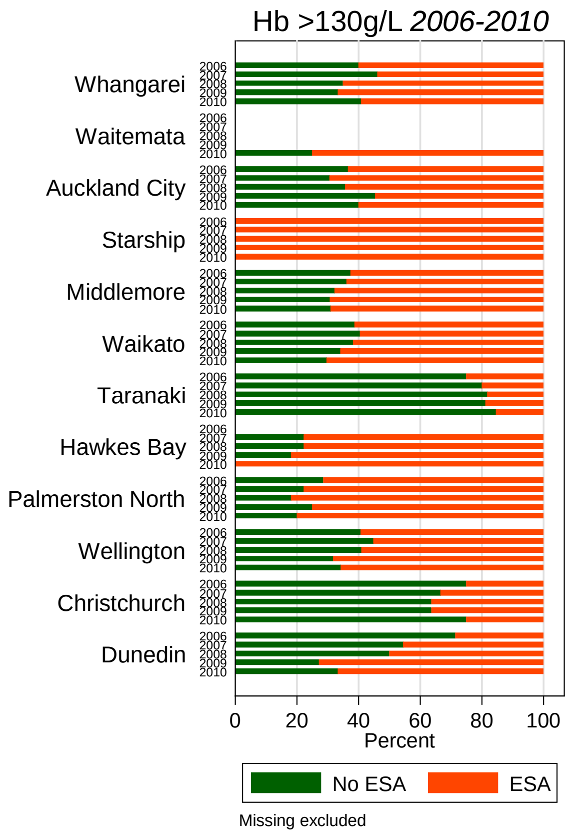

Fig. 17 Haemoglobin concentrations greater than 130g/L in dialysis patients

marked variation in EPO management across units. The tightest EPO and Hb management is achieved by Taranaki.

Transplantation Rates

- Transplantation rates are a combination of both live and deceased donor transplants. In 2010 only 108 transplants were performed, the lowest number since 2006. Of these 44% were deceased donor transplants and 56% from live donors.
- It should be noted that transplantation rates in NZ are low and inevitably there will be considerable year to year variation for individual units.

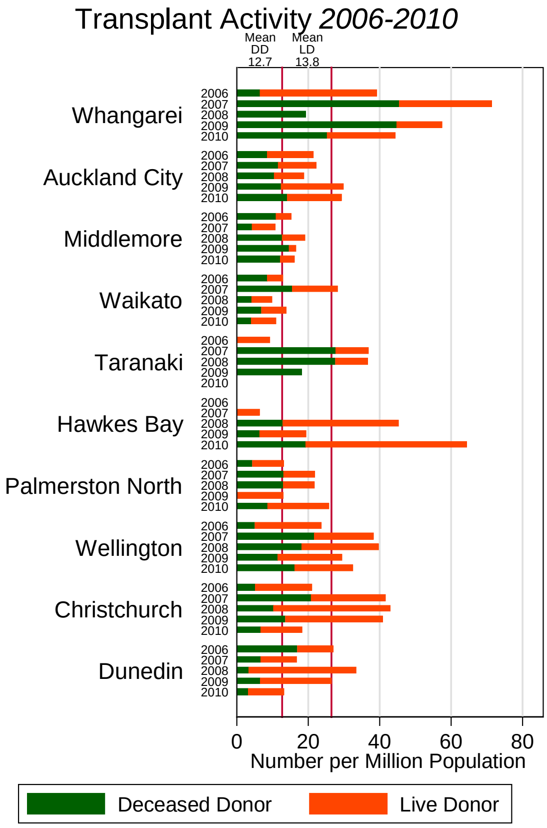

Fig. 18 Transplantation rates per million general population (deceased and live donor)

- Overall the transplant rate in NZ in 2010 was 24.7 pmp, down from 28.9 in 2007. This varied from 64.4 pmp in Hawke's Bay to just 11.0 and 11.3 pmp in Waikato and Dunedin respectively. Taranaki received no transplants at all in 2010 (Fig. 18).
- When transplantation rates are compared against each service's dialysis population, there remains similar variation, from 16 transplants per 1000 dialysis patients in Middlemore and Waikato to 116 in Hawke's Bay (national average 45) (Fig. 19).
- Variation in transplantation rates can be largely explained by demographic differences in the population served by the different renal units. A more

comparable measure might be the deceased donor transplantation rate for dialysis patients on the waiting list at any time. This comparison (Fig. 20) reveals considerable variation between the different units. In 2010 the overall deceased donor rate for New Zealand was 7.3 transplants per 100 waitlisted patients, ranging from 12.5 in Wellington to just 3.3 in Waikato. The explanation for this variation is unclear, especially as this appears to be a trend over a number of years and is not restricted to just 2010. The reasons for this variation merit further analysis.

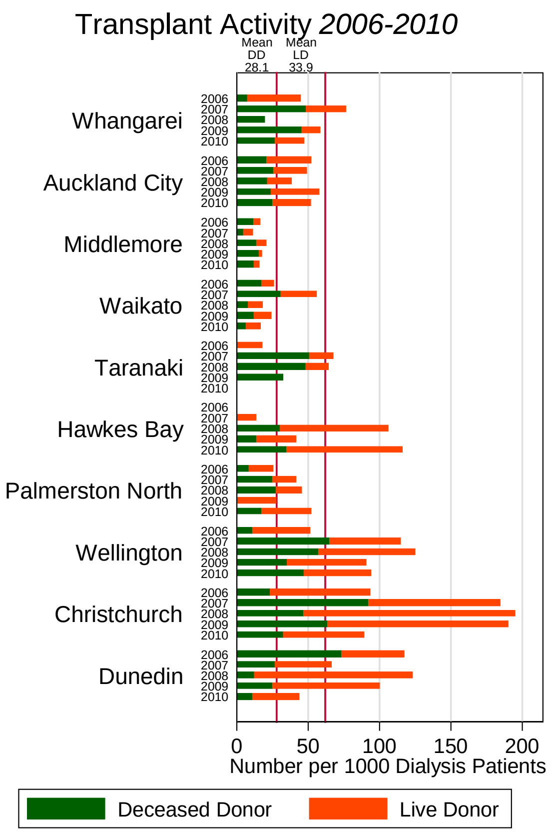

Fig. 19 Transplantation rates (deceased and live donor) per 100 dialysis patients

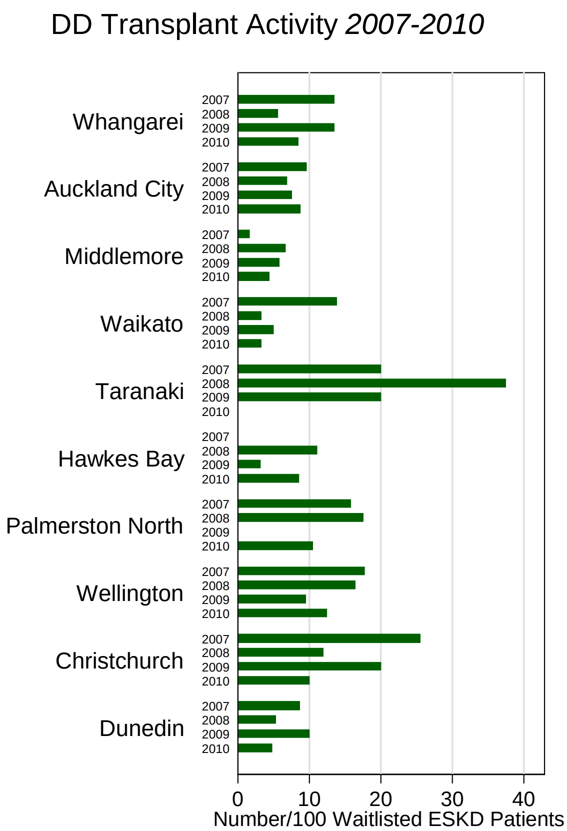

Fig. 20 Deceased donor transplantation rates per 100 dialysis patients waitlisted at 31 December

Acknowledgments

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