



National Renal
Advisory Board

New Zealand

Dialysis and Transplantation Audit

2011

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

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Standards and Audit Subcommittee

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 2011 was 108 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 Hawke's Bay (193 pmp) and the lowest at Waitemata (42 pmp).
- Dialysis prevalence, which has continued to increase in recent years, appears to have also plateaued at 541 pmp nationally compared to 544 pmp in 2010. Prevalence ranges from 1020 pmp at Middlemore to just 208 pmp at Christchurch. The Auckland, Middlemore, Waikato and Hawkes' Bay units continue to show the greatest increase in dialysis numbers.
- The prevalent dialysis modality has changed little in recent years, with peritoneal dialysis (PD) usage ranging from 14% at Auckland to 52% at Waikato (national average 33%). Home haemodialysis usage ranges from 12% in Hawke's Bay to 47% in Dunedin respectively (national average 18%).
- Most units now meet the standard of > 70% prevalent haemodialysis (HD) patients using permanent vascular access (78% nationally), although there has been no improvement in recent years. Catheter usage remains > 20% nationally (22%) with only Dunedin and Whangarei achieving less than 10% catheter use. However catheter associated bloodstream infection rates remain low consistently across the country.
- Preparation for HD remains poor although has improved compared to 2010. 39% of non-late start HD patients across the country began dialysis with permanent access compared to 32% in 2010. Palmerston North made the greatest gains achieving this for 71% of its patients, a marked improvement on previous years.
- Preparation for PD has improved slightly with only 17% of non-late start PD patients initiating dialysis with a period of HD (20% in 2010).

- Fewer HD patients are receiving less than 4.5 hours per dialysis session (33% in 2011) ranging from 7% in Christchurch to 54% in Auckland City, and this variation is mirrored by dialysis adequacy measures in these units. Over 10% of HD patients are now routinely receiving more than three dialysis sessions per week, predominantly in Christchurch and Dunedin.
- There remains considerable variation in the management of erythropoietin to maintain haemoglobin (Hb) concentrations between 100-130 g/L. Nationally only 68% of patients administered EPO had haemoglobin concentrations in the target range. Many patients with Hb > 130 g/L continue to have erythropoietin administered, with both safety and cost implications.
- 2011 saw a slight increase in transplantation operations compared to the very low number in 2010 (114 vs 108), with an increase in deceased donor operations, accounting for 50%. There remains marked variation in transplant rates across units, both live and deceased donor operations. Even when patients are listed on the national deceased donor waiting list there is significant variation in transplantation rates across units, for reasons that are not easily explained.

If it is accepted that the above standards are reflective of best practice dialysis and transplant 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. Some services however show considerable improvement in some standards and may possibly be seen as exemplars to other services. Further analysis of the differences between units, particularly with regard to transplantation rates is warranted.

Introduction

The National Renal Advisory Board (NRAB) presents its eighth 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. Once again comparative data relating to transplantation rates has been reported.

More complete data is reported for the renal service at Waitemata DHB, which has now taken back all its dialysis patients and most transplant patients from the Auckland City service. Starship Children's service is represented separately for some analyses but otherwise is included within the Auckland City data.

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 registry. 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 2011 Report includes data from the 2011 ANZDATA Registry Report, for the calendar year ending 31 December 2011, 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 database. 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 Murray Leikis, Chair of NRAB Murray.Leikis@ccdhb.org.nz or Grant Pidgeon grant.pidgeon@ccdhb.org.nz .

Demography

- In 2011 477 patients commenced renal replacement therapy (RRT) in New Zealand (26 fewer than in 2010), giving an incidence of 108 per million population (pmp) (Table 1). This is only a slight reduction on incidence rates over recent years, with the exception of 2009 where 583 patients commenced RRT (incidence rate of 135 pmp).
- Incidence rates in 2011 continue to vary markedly across the country from a high of 193 pmp at Hawke's Bay to just 42 pmp in Waitemata (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% (national rate 15.2), whereas the Middlemore unit has a greatly increased number of Pacific people at 22% (national rate only 6.5%). There is considerably less variation in the age structure of the populations of the various renal units

Table 1. Renal Service Demographics 2011

	Pop*	% Maori	% Pacific	% Other	Age 0-29yr	Age 30-49yr	Age 50-69yr	Age 70+
Whangarei	158,150	32.2%	1.7%	66.2%	38.8%	24.0%	26.0%	11.1%
Waitemata	545,820	9.7%	7.1%	83.1%	41.8%	28.9%	21.1%	8.2%
Auckland City	456,570	7.9%	11.4%	80.8%	43.5%	31.2%	18.7%	6.6%
Middlemore	499,150	16.4%	22.3%	61.3%	47.1%	27.3%	19.3%	6.4%
Waikato	729,150	26.1%	2.1%	71.8%	41.5%	25.4%	22.9%	10.2%
Hawke's Bay	155,710	25.2%	3.2%	71.6%	40.1%	25.2%	24.1%	10.7%
Palm Nth	231,645	20.6%	2.3%	77.2%	41.5%	24.2%	23.1%	11.2%
Taranaki	109,720	17.1%	1.0%	81.9%	39.3%	25.4%	23.9%	11.4%
Wellington	619,815	12.4%	5.8%	81.8%	40.4%	28.0%	22.3%	9.2%
Christchurch	592,500	8.1%	2.0%	89.9%	38.5%	27.0%	23.8%	10.7%
Dunedin	306,260	8.9%	1.5%	89.6%	40.6%	25.6%	23.4%	10.4%
New Zealand	4,404,490	15.2%	6.5%	78.3%	41.6%	27.1%	22.1%	9.2%

	Incident numbers	Incidence rate (pmp)	Dialysis Prevalent numbers	Dialysis Prevalence rate (pmp)	Transplant Prevalent numbers	Transplant prevalence rate (pmp)	Total Prevalent numbers	Total Prevalence rate (pmp)
Whangarei	22	139	140	885	63	398	203	1,284
Waitemata	23	42	224	410	135	247	359	658
Auckland City	66	145	338	740	231	506	569	1,246
Middlemore	91	182	509	1,020	127	254	636	1,274
Waikato	85	117	464	636	166	228	630	864
Hawke's Bay	30	193	93	597	74	475	167	1,073
Palm Nth	20	86	118	509	59	255	177	764
Taranaki	16	146	58	529	32	292	90	820
Wellington	60	97	220	355	251	405	471	760
Christchurch	40	68	123	208	253	427	376	635
Dunedin	24	78	94	307	97	317	191	624
New Zealand	477	108	2,381	541	1,488	338	3,869	878

* Estimate from 2006 census (Ministry of Health)

Incidence – number of new patients commencing dialysis treatment (or pre-emptive transplant) during the calendar year

Prevalence – number of patients receiving dialysis or transplantation treatment at the end of the calendar year ie. 31/12/11

Per million population (pmp)

Unit Coverage

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

where Middlemore again has the youngest population and the smallest proportion of elderly patients (Table 1).

- In previous years despite the plateau in the incidence rates, prevalence numbers had continued to increase each year at a rate of around 4% per annum. By contrast in 2011 the total number of dialysis patients changed minimally from 2,378 to 2,381 giving a prevalence rate of 541 pmp, compared to 544 pmp in 2010 (Table 1). Transplant numbers increased by 3.3% from 1,441 to 1,488, leading to an overall prevalence for renal replacement therapy of 878 pmp, compared to 879 pmp for 2010 (Table 1 & Fig. 1).

- Dialysis prevalence rates also vary considerably and are highest in those units serving populations with high percentages of Maori and Pacific people. Waikato and Middlemore

continue to grow most rapidly, as does Hawke's Bay. Although having a much lower prevalence rate, the Wellington unit has seen sustained growth over the last three years (Fig. 2).

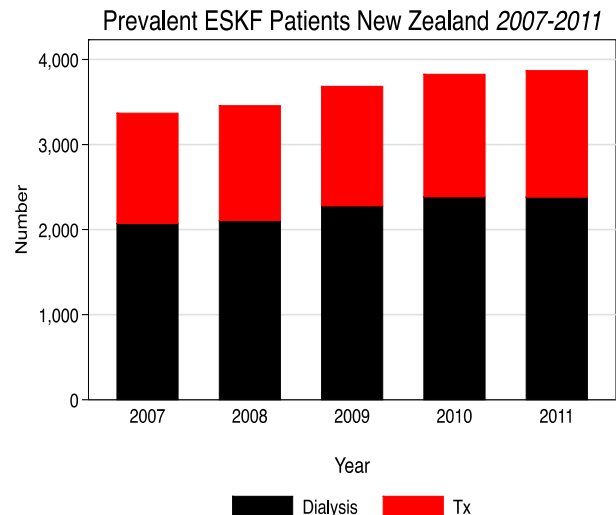


Fig. 1 Dialysis and Transplant Prevalence

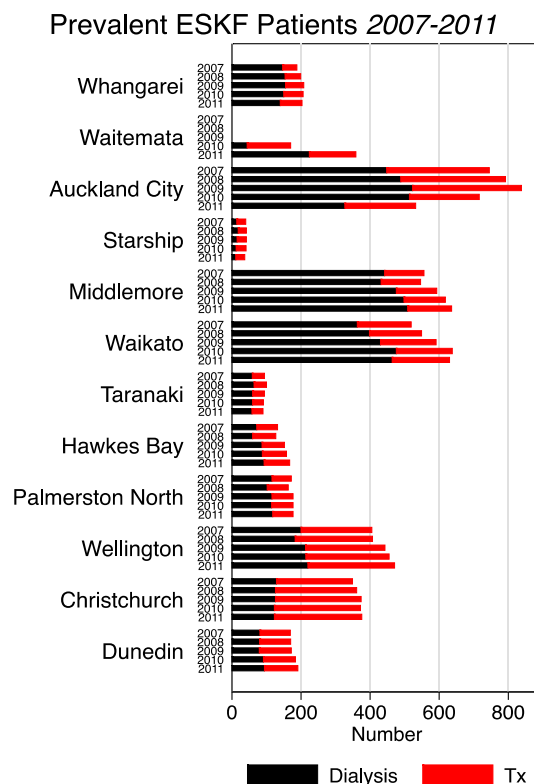


Fig. 2 Dialysis & Transplant Prevalence

Dialysis Modality

- In 2011 there were only 15 pre-emptive transplants performed (3.1% of incident patients), which is lower than the previous two years (Fig. 3).
- Of patients commencing dialysis in 2011 68% initially received some form of haemodialysis, similar to that seen in 2010. This varied from only 48% in Dunedin to 86% in Hawke's Bay. 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 dropped slightly to just 33% of all dialysis patients, although ranges from 52% in Waikato to just 14% in Auckland City. The number of patients performing home haemodialysis continues to slowly increase and is now 18% of prevalent dialysis patients (Fig. 4), ranging from 47% in Dunedin to just 12% in Hawke's Bay, Auckland City and Taranaki.

Incident Modality 2007-2011

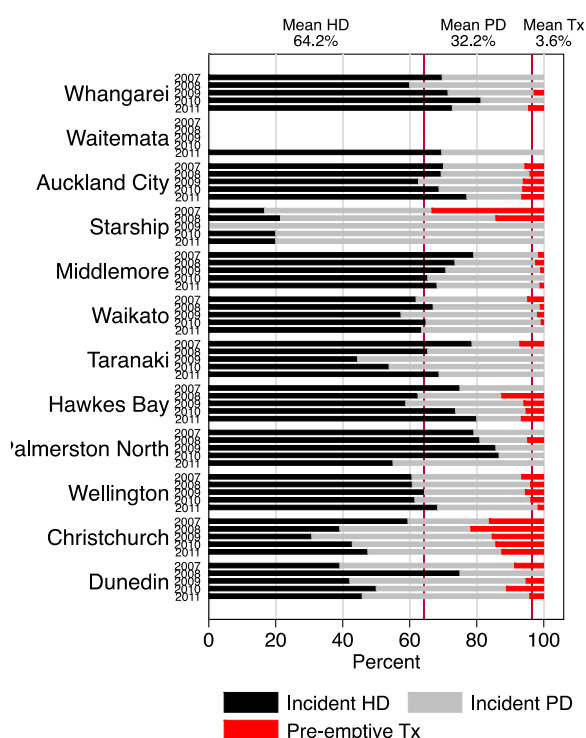


Fig. 3 Incident Modality

Prevalent Modality 2007-2011

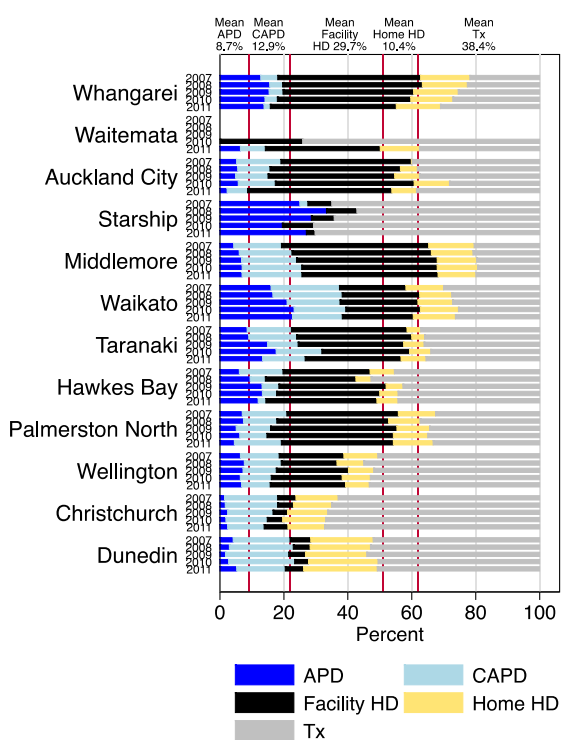


Fig.4 Prevalent Modality

Starship has 83% of its prevalent patients on APD.

- The use of automated peritoneal dialysis (APD) is stable at 42% of all PD patients and continues to show marked variation across units (Fig. 4).

Vascular access for haemodialysis

- Nationally 78% of prevalent HD patients were dialysing with permanent access (fistula or AV graft) rather than a catheter, exceeding the proposed standard of 70%. Only one unit, Taranaki, failed to achieve this standard at 59%. The two most successful units were Dunedin at 91% and Whangarei at 89%. Palmerston North improved from just 44% in 2010 to 66% in 2011, whereas most other units showed minimal change (Fig. 5).
- There remains marked variation in the use of AV grafts for permanent vascular access with only Dunedin (22%) and Waikato (15%) employing grafts to any significant degree (Fig. 5).
- Catheter use for HD remains high at 22% nationally, ranging from 41% in Taranaki (the centre with the lowest percentage catheter use in 2010) to 9% in Dunedin and Whangarei, the only two units to achieve the standard of less than 10% catheter use for prevalent HD patients (Fig. 5).

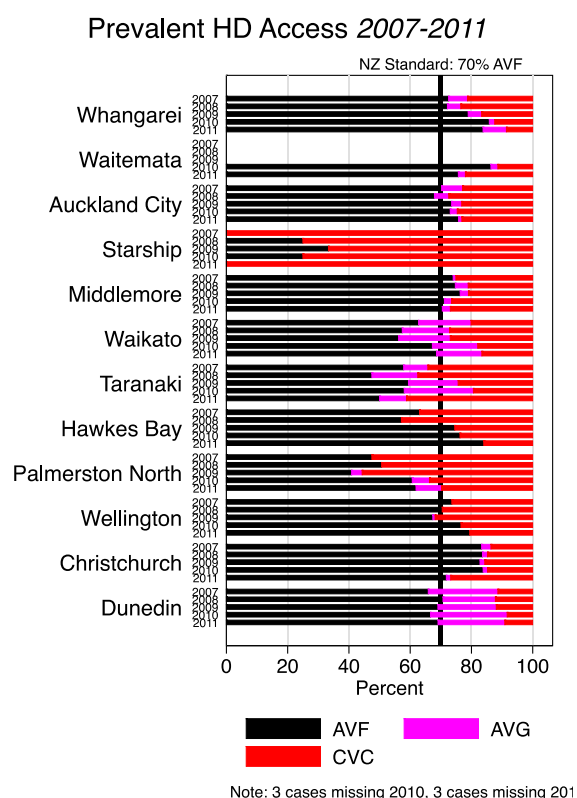


Fig.5 Prevalent HD Access

- There has been some improvement in the number of HD incident patients commencing dialysis with permanent access. Nationally this has improved from 25% in 2010 to 30% in 2011 (Fig. 6).
- No unit achieved the standard of 50% of all patients starting with permanent access, the closest being Hawke's Bay at 46% and Palmerston North at 45%. Only 9% of patients at Taranaki and 18% at Middlemore commenced dialysis with permanent access (Fig. 6).
- The corresponding figure for non-late start patients in 2011 is 39%, well below the standard of 80%, but an improvement on the 32% achieved in 2010 (Fig. 7). Only one unit, Palmerston North at 71%, achieved close to this standard in 2011, with most other units failing to show any improvement at all (Fig. 7).
- All but one unit continue to report catheter associated bloodstream infection (CABSI) rates and all exhibit rates well under the international standard of 4 episodes per 1000 catheter days, ranging from 0.28 in Wellington

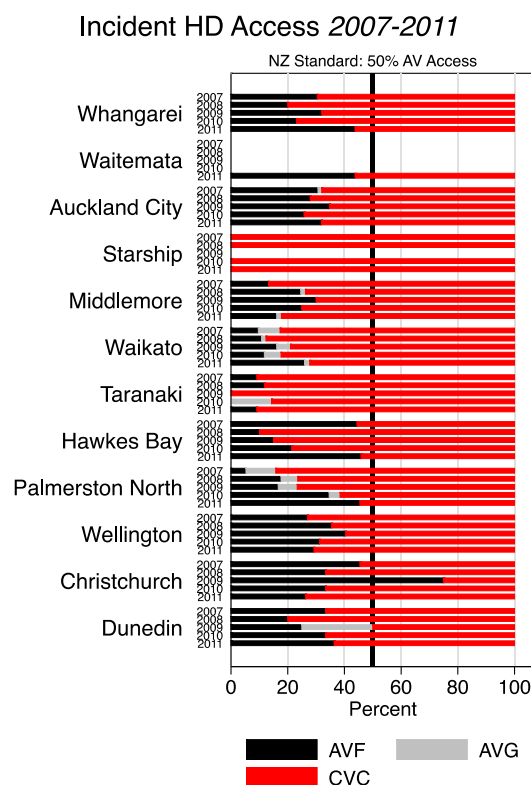


Fig.6 Incident HD Access – All Patients

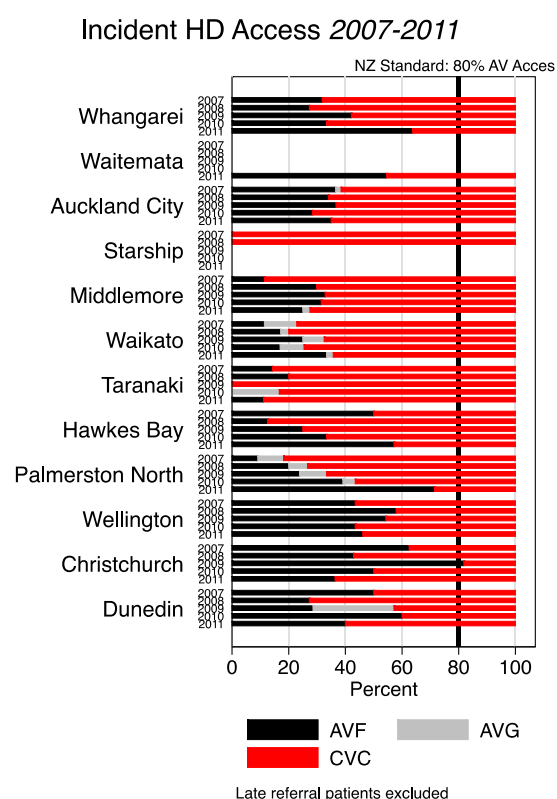


Fig.7 Incident HD Access – Non-late Start Patients

to 2.2 in Hawke's Bay. However given the high catheter usage rates this still reflects considerable morbidity (Fig. 8).

Peritoneal dialysis (PD)

- There has been just a slight reduction in the percentage of prevalent patients using PD in 2011 (33% of all dialysis patients), and an increase in the use of APD (42% of all PD patients) (Figs. 3 & 4).
- The percentage of non-late start patients transferring to PD after beginning dialysis with HD (usually using a CVC) has improved to only 17% in 2011 compared to 20% in 2010. This ranged from 0 patients in Auckland City, Hawke's Bay, Palmerston North, Starship and Waitemata, to 35% of new PD patients in Waikato and 23% in Dunedin.
- Peritonitis rates reported to ANZDATA show continued improvement in 2011 for most services (Fig. 9). All but one service now achieve the standard of greater than 18 patient months PD per episode of peritonitis, and many now exceed 24 months.

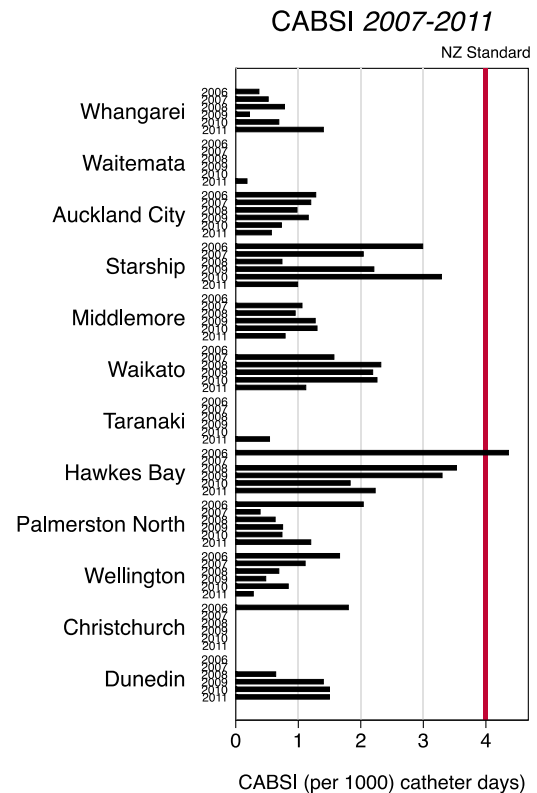


Fig.8 Catheter Associated Bloodstream Infection Rate

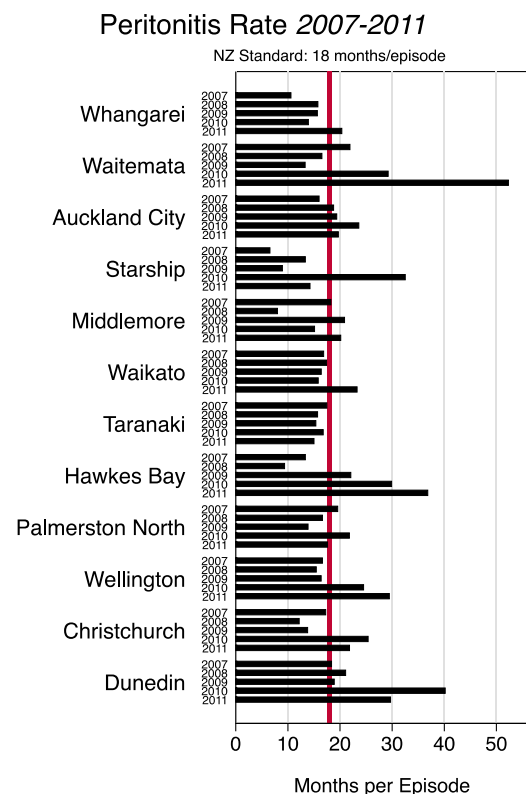


Fig.9 Peritonitis Rates

Haemodialysis adequacy, frequency and duration of treatment

- The number of haemodialysis patients receiving less than 4.5 hours dialysis per session has dropped considerably in 2011 to just 33%, ranging from 7% in Christchurch to 54% in Auckland and 48% in Taranaki (Fig. 10).
- Only a handful of patients receive less than 3 sessions per week, whereas the number receiving more than 3 sessions per week has increased further to 10.4% in 2011. This however is primarily in just two units, Christchurch (41%) and Dunedin 36% (Fig. 11).
- 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 adequacy is given in Figure 12. 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.

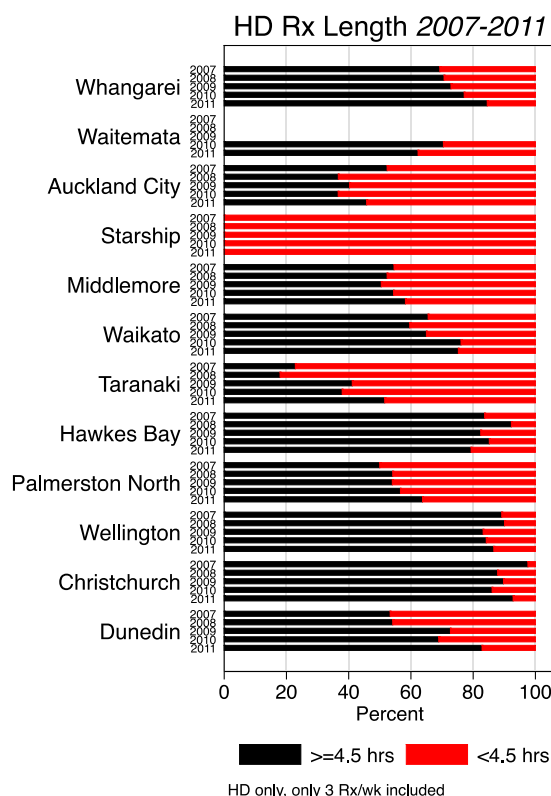


Fig.10 HD Session Length

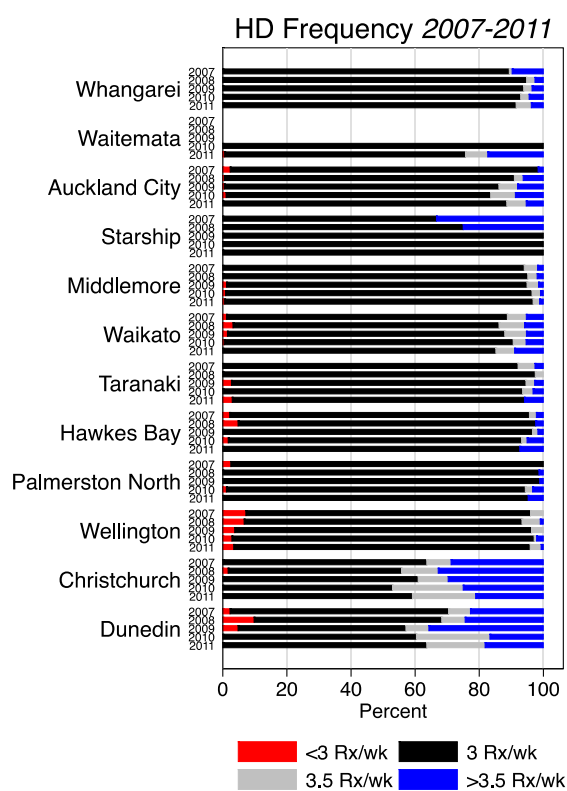


Fig.11 HD Session Frequency

- Excluding missing data, 72% of patients nationally received adequate dialysis as evidenced by a Kt/V > 1.2. No patients at Whangarei had Kt/V less than 1.2 compared to 39% of patients at Auckland City (Fig. 12).
- The amount of missing data reflects both unit preference as well as the difficulty in obtaining results from home-based haemodialysis patients.

Anaemia management

- For the purpose of this report the target haemoglobin (Hb) concentration for a patient on dialysis should be greater than 100g/L and less than 130g/L if prescribed erythropoietin (EPO) therapy, although it is noted that some international guidelines have revised their Hb targets to 100-120g/L.
- At the end of 2011 82% of all dialysis patients were prescribed EPO, and of these patients 68% had Hb concentrations in the range 100-130g/L (Fig. 13).
- At the end of 2011 20% of NZ dialysis patients had Hb concentrations less than 100g/L, ranging from just 9% in Palmerston North to

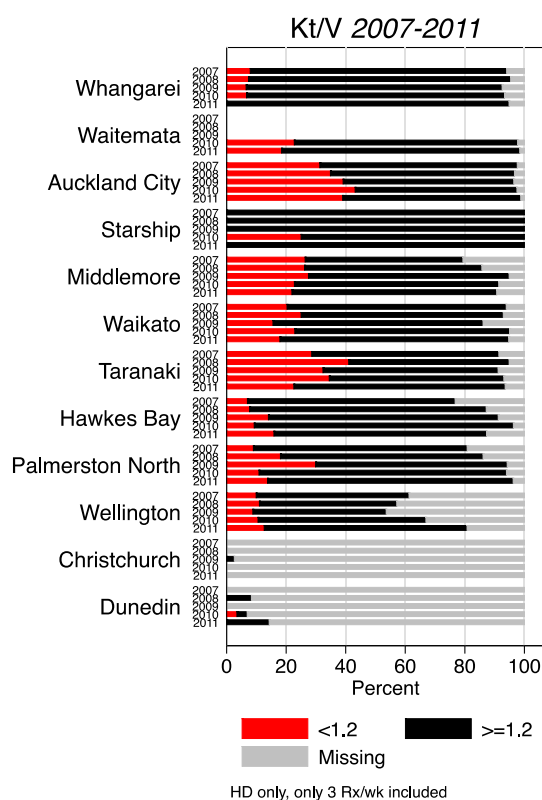


Fig.12 HD Adequacy

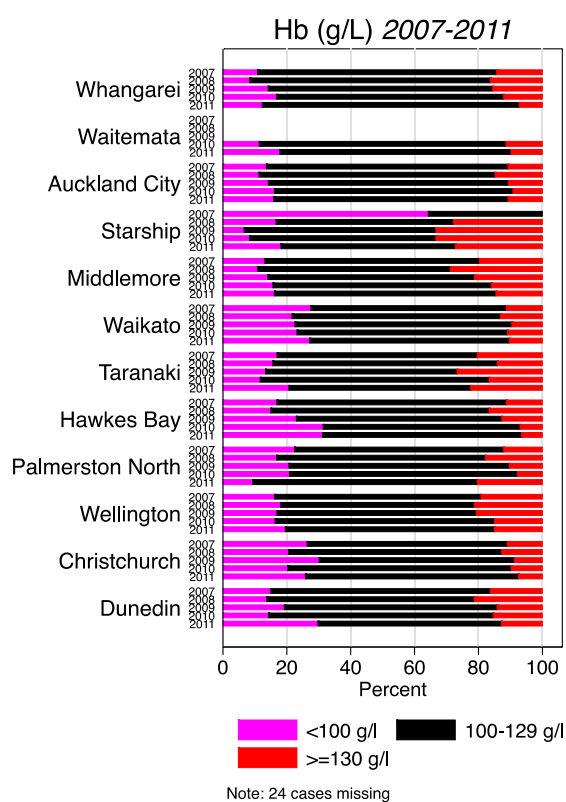


Fig.13 Haemoglobin Concentration

30% in Dunedin (Fig. 13). Of these patients 94% were receiving EPO treatment (Fig. 14). Of all patients receiving EPO treatment 23% had Hb concentrations less than 100g/L.

- By contrast only 8% of patients receiving EPO had Hb concentrations > 130g/L, considerably improved on the 11% in 2010 (Fig. 13). Nationally 55% of patients with Hb > 130 g/L continued to be administered EPO, ranging from 13% in Palmerston North to no patients receiving EPO in Hawke's Bay (Fig. 15).
- Again these data reveal that there appear to be considerable differences in individual services use and monitoring of EPO and haemoglobin response.

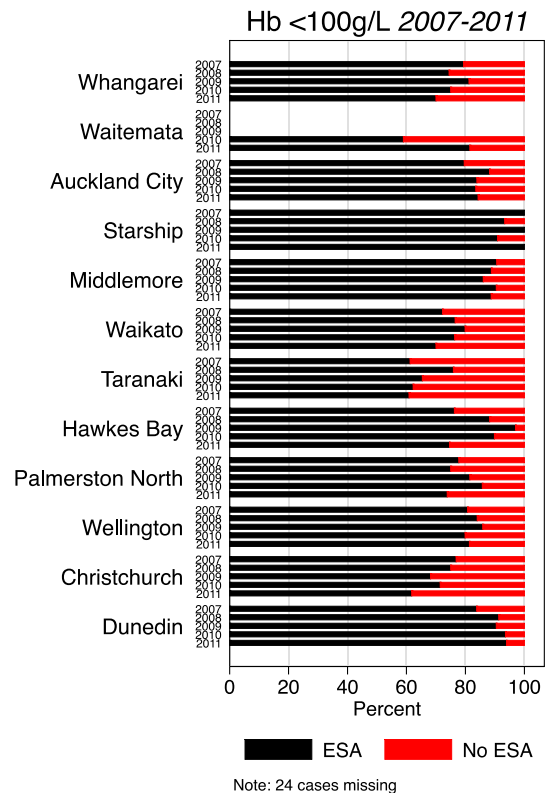


Fig.14 Haemoglobin Concentration < 100g/L

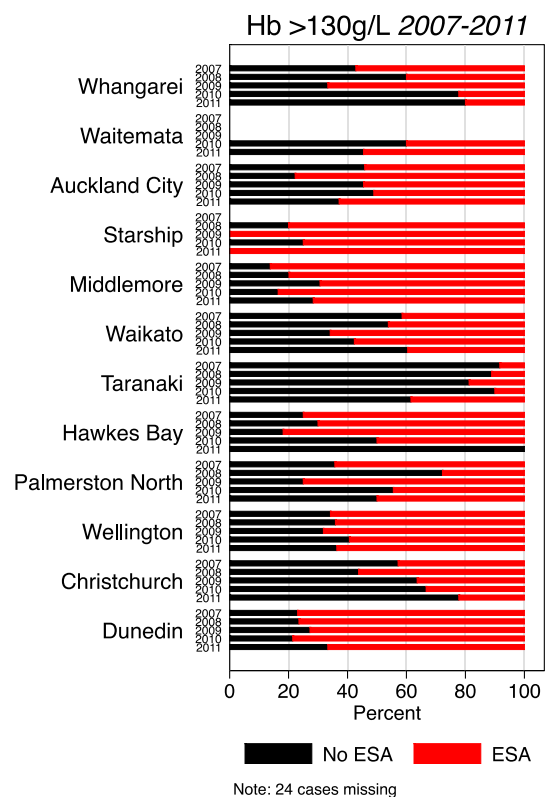


Fig.15 Haemoglobin Concentration > 130g/L

Transplantation Rates

- Transplantation rates are a combination of both live and deceased donor transplants. In 2011 only 114 transplants were performed (5% increase on 2010 numbers), a rate of only 26 per million population (pmp). Of these 50% were deceased donor transplants and 50% from live donors (Fig. 16).
- Transplantation rates continue to vary markedly between units, although it should be noted that because transplantation rates in NZ are so low, considerable year to year variation is to be expected. Unit specific transplantation rates varied from 50.6 pmp in Whangarei to just 7.3% in Waitemata (Fig. 16).
- When transplantation rates are compared against each service's dialysis population, there remains similar variation (nearly 4 fold), from 1.8 transplants per 100 dialysis patients in Waitemata and 2.9 in Middlemore, to 10.9 per 100 dialysis patients in Christchurch and 9.6 in Dunedin (national average 4.8) (Fig. 17).
- Variation in transplantation rates can be largely explained by demographic differences in the populations served by the different renal units.

Transplant Activity 2007-2011

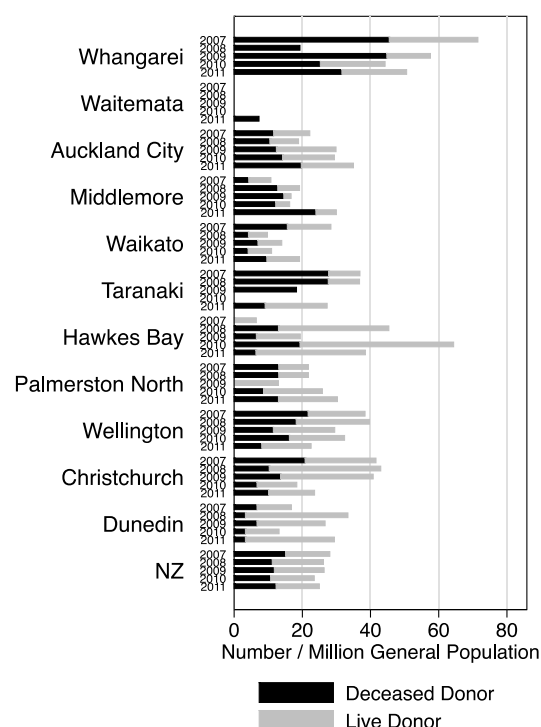


Fig.16 Transplantation Rates per Million General Population

Transplant Activity 2007-2011

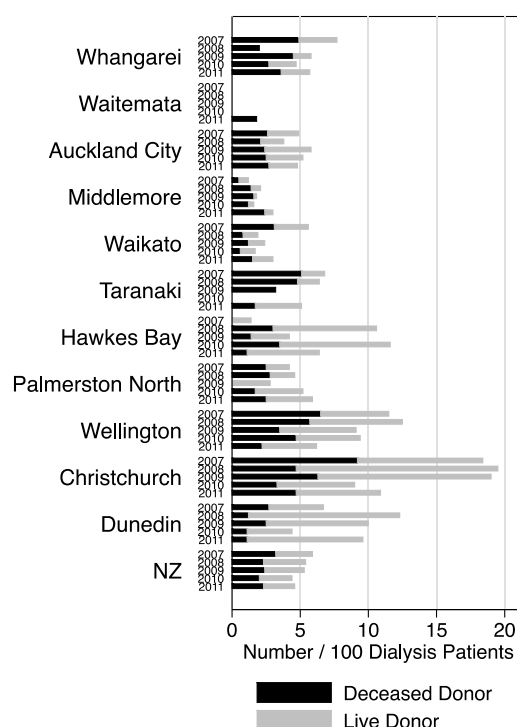


Fig.17 Transplantation Rates per 100 Dialysis Patients

Access to live donor transplantation will also explain some of the variation. A more comparable measure may be the deceased donor transplantation rate for dialysis patients on the waiting list at any time. This comparison (Fig. 18) still reveals considerable variation between the different units. In 2011 the overall deceased donor rate for New Zealand was 8.6 transplants per 100 waitlisted patients, ranging from just 3.6 in Hawke's Bay to 15.0 in Christchurch, again a four-fold variance. The explanation for this marked variation remains unclear. Given that there is considerable year by year variation in transplantation rates it may be more prudent to look at further analyses including mean rates over a number of years.

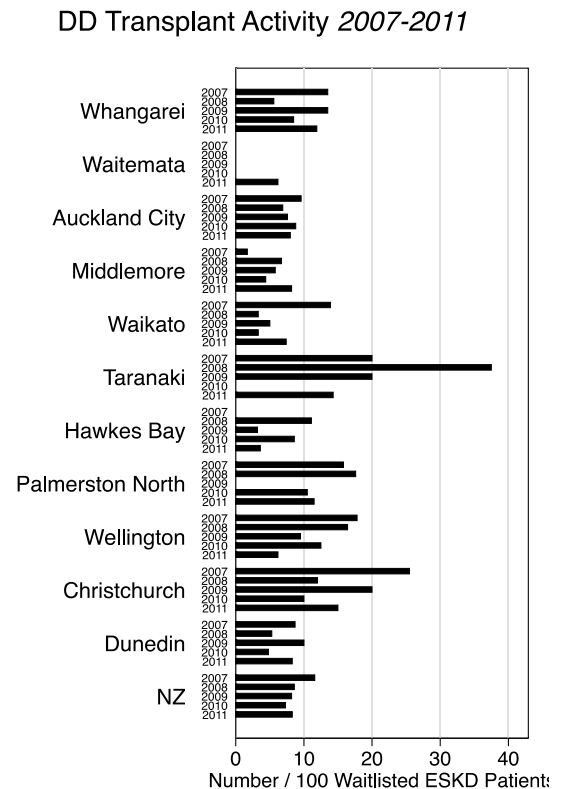


Fig.18 Transplantation Rates per 100 Waitlisted Patients

Acknowledgments

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