



Australia &
New Zealand Dialysis
& Transplant Registry

Chapter 11

Paediatrics

ANZDATA gratefully acknowledges the contributions of the Paediatric Working Group convened by Dr Sean Kennedy

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This year, as well as providing a summary of current trends in the frequency and causes of ESKD, the paediatric report will focus on current trends in the epidemiology and outcomes of dialysis delivery and adequacy, technique survival and biochemical outcomes, as well as an overview of the frequency, causes and treatment of children and adolescents with ESKD.

Incidence and prevalence

General Overview

As shown in figure 11.1, there is no clear long term trend in the incidence of children and adolescents developing ESKD and being treated with renal

replacement therapy, although there are fluctuations from year to year.

Figure 11.1.1

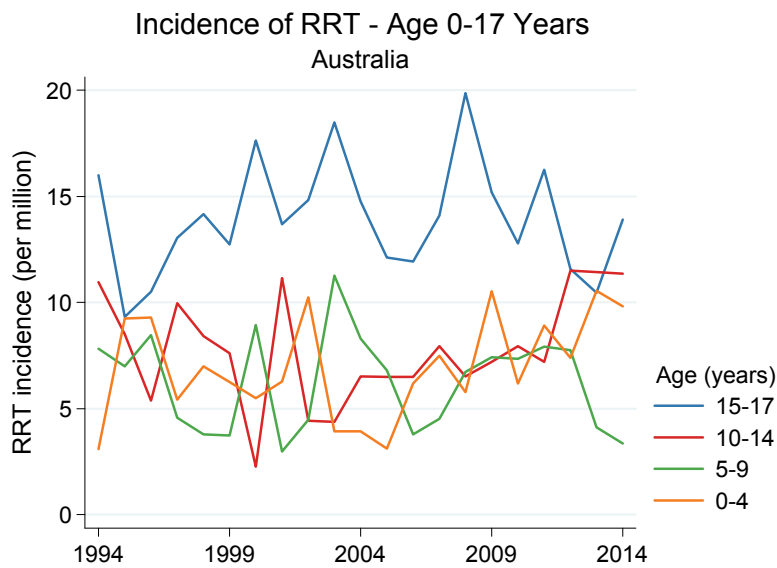
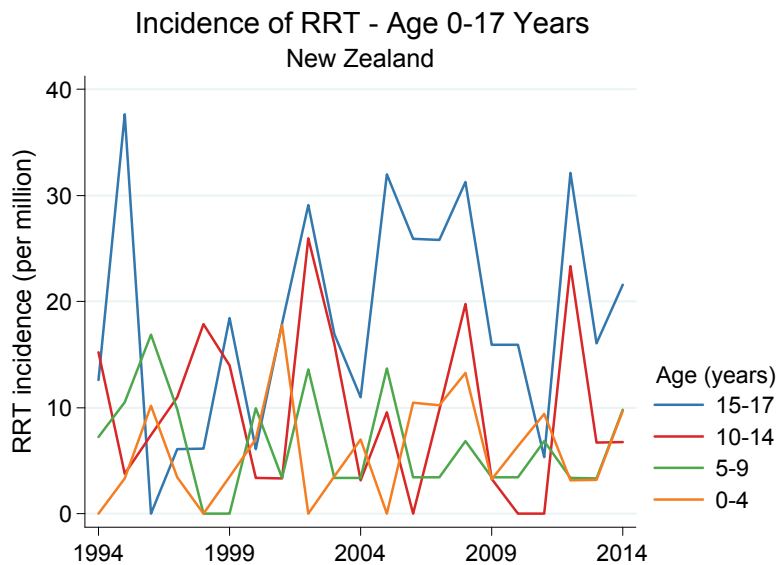


Figure 11.1.2



In Australia the prevalent numbers of treated ESKD have gradually increased across all age groups reflecting improved survival through increased duration

of ESKD (figure 11.2); the trends are less clear in New Zealand.

Figure 11.2.1

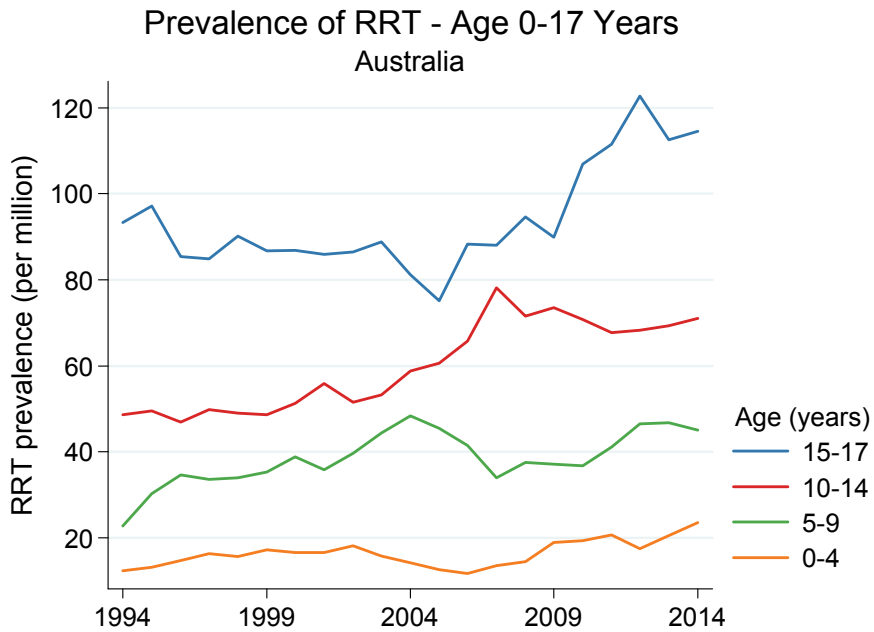
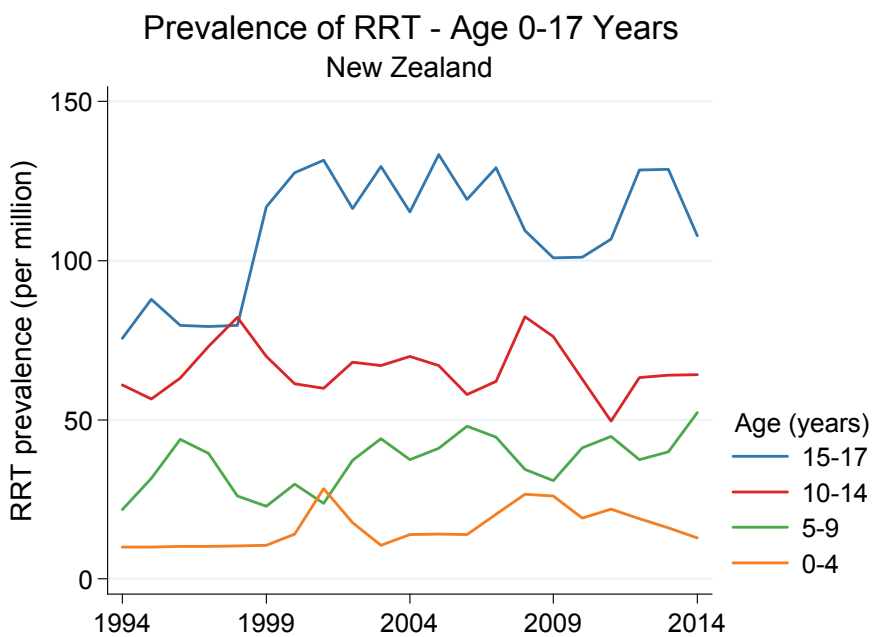


Figure 11.2.2



Primary Renal Disease

Overall, glomerulonephritis remains the most common cause of ESKD in children and adolescents (29%), but causes vary significantly with age (table 11.1). In young

children renal hypoplasia/dysplasia is the most common cause.

Table 11.1. Primary Renal Disease, Incident Patients Australia and New Zealand 2009-2014

Primary Renal Disease	0-4	5-10	10-14	15-17	Total
GN	6 (7%)	17 (24%)	27 (27%)	33 (35%)	83 (23%)
- FSGS	1 (1%)	8 (11%)	8 (8%)	5 (5%)	22 (6%)
Familial GN	3 (3%)	-	2 (2%)	2 (2%)	7 (2%)
Reflux Nephropathy	3 (3%)	4 (6%)	6 (6%)	6 (6%)	19 (5%)
Polycystic Kidney Disease	6 (7%)	4 (6%)	2 (2%)	5 (5%)	17 (5%)
Medullary Cystic Disease	-	4 (6%)	8 (8%)	3 (3%)	15 (4%)
Posterior Urethral Valve	9 (10%)	1 (1%)	11 (11%)	3 (3%)	24 (7%)
Haemolytic Uraemic Syndrome	4 (4%)	1 (1%)	2 (2%)	2 (2%)	9 (3%)
Hypoplasia/Dysplasia	28 (31%)	15 (21%)	14 (14%)	8 (9%)	65 (18%)
Diabetes	1 (1%)	-	-	2 (2%)	3 (1%)
Cortical Necrosis	2 (2%)	2 (3%)	1 (1%)	3 (3%)	8 (2%)
Interstitial Nephritis	-	1 (1%)	1 (1%)	-	2 (1%)
Cystinosis	-	2 (3%)	1 (1%)	-	3 (1%)
Uncertain	1 (1%)	2 (3%)	-	5 (5%)	8 (2%)
Misc/Other	27 (30%)	9 (13%)	16 (16%)	17 (18%)	69 (19%)
Total	91	70	99	94	332

Modality of Treatment

The modality of the first renal replacement treatment is shown in table 11.2. Although numbers are small and therefore fluctuate from year to year, around 20% of children and adolescents receive pre-emptive kidney transplants. Of the remainder, HD is more common in older patients (10-17 years) and PD more common in

younger patients (<10 years).

For prevalent patients (table 11.3), a very different pattern is seen, with the great majority of children and adolescents with a functioning transplant. This reflects the relatively high rate of transplantation among children.

Table 11.2. Modality of Initial Renal Replacement Therapy by Year of First Treatment, Australia and New Zealand

Age Group	2009	2010	2011	2012	2013	2014	Total
0-9 Years	27	22	29	24	24	26	152
- HD	4 (15%)	5 (23%)	10 (34%)	8 (33%)	6 (25%)	7 (27%)	40 (26%)
- PD	17 (63%)	14 (64%)	14 (48%)	12 (50%)	16 (67%)	18 (69%)	91 (60%)
- Transplant	6 (22%)	3 (14%)	5 (17%)	4 (17%)	2 (8%)	1 (4%)	21 (14%)
10-17 Years	27	25	25	39	30	34	180
- HD	12 (44%)	13 (52%)	8 (32%)	16 (41%)	12 (40%)	10 (29%)	71 (39%)
- PD	12 (44%)	5 (20%)	12 (48%)	15 (38%)	12 (40%)	15 (44%)	71 (39%)
- Transplant	3 (11%)	7 (28%)	5 (20%)	8 (21%)	6 (20%)	9 (26%)	38 (21%)
Total	54	47	54	63	54	60	332

Table 11.3. Modality of Prevalent Patients by Year of Treatment, Australia and New Zealand

Current Treatment	2009	2010	2011	2012	2013	2014	Total
HD	29 (9%)	30 (9%)	29 (9%)	30 (8%)	30 (8%)	23 (6%)	171 (8%)
PD	57 (18%)	50 (15%)	53 (16%)	49 (14%)	46 (13%)	49 (14%)	304 (15%)
Transplant	229 (73%)	244 (75%)	250 (75%)	274 (78%)	277 (78%)	289 (80%)	1563 (77%)
Total	315	324	332	353	353	361	2038

Dialysis Delivery and Adequacy

Dialysis Demographics

Various dialysis process indicators are summarized in Figures 11.3 - 11.8. For all of these graphs, the box indicates the 25th, 50th, and 75th centiles. The “whiskers” indicate the 95th centiles for each category.

Figure 11.3.1

Haemoglobin, December 2010-2014
Australia

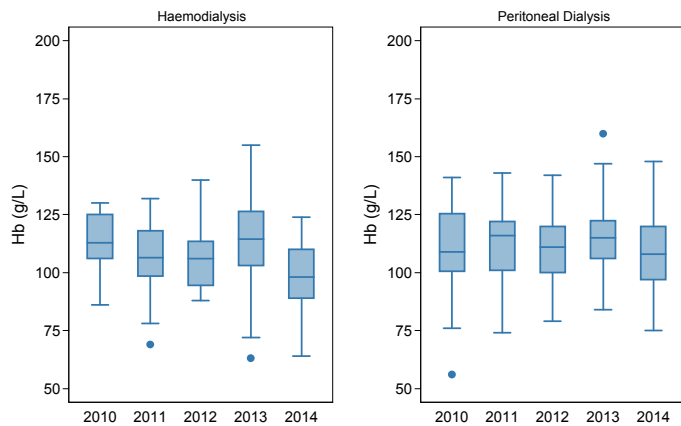


Figure 11.3.2

Haemoglobin, December 2010-2014
New Zealand

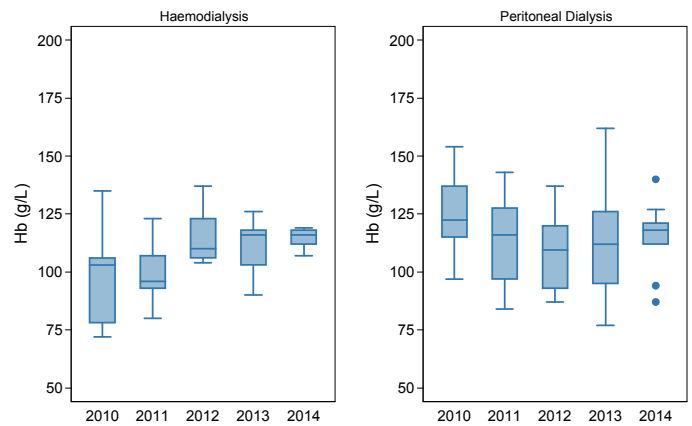
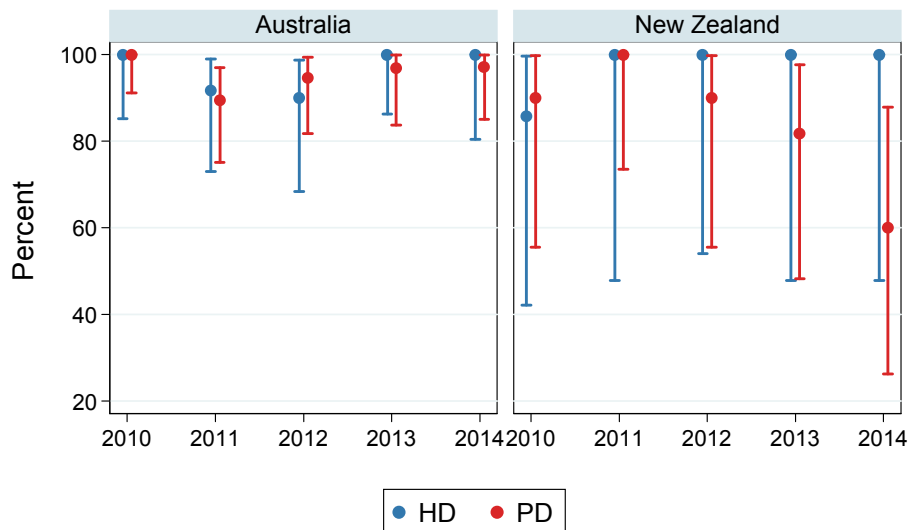


Figure 11.4

Use of Erythropoietic Agents
December 2010-2014



Dialysis adequacy is reported for the majority of NZ patients. However the reporting rates of adequacy for Australian patients are low, particularly for those on PD. The NZ data suggest that the majority of patients meet accepted targets for adequacy.

Figure 11.11 Urea Reduction Ratio (HD Patients)
December 2010-2014

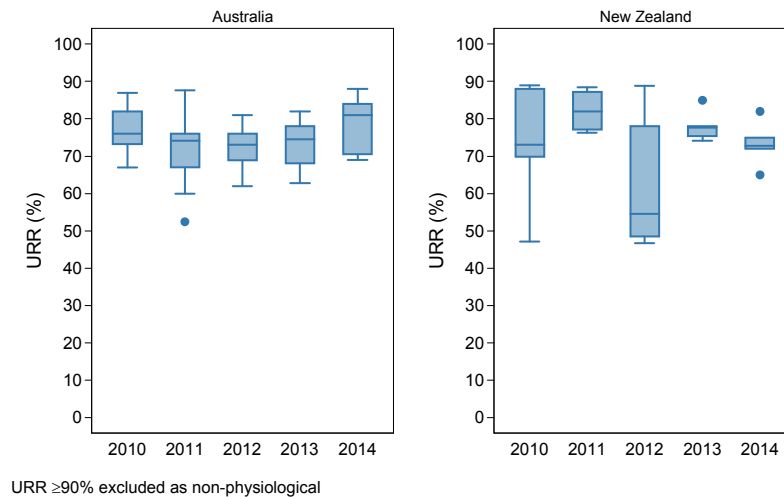


Figure 11.12 Kt/V (PD Patients)
December 2010-2014

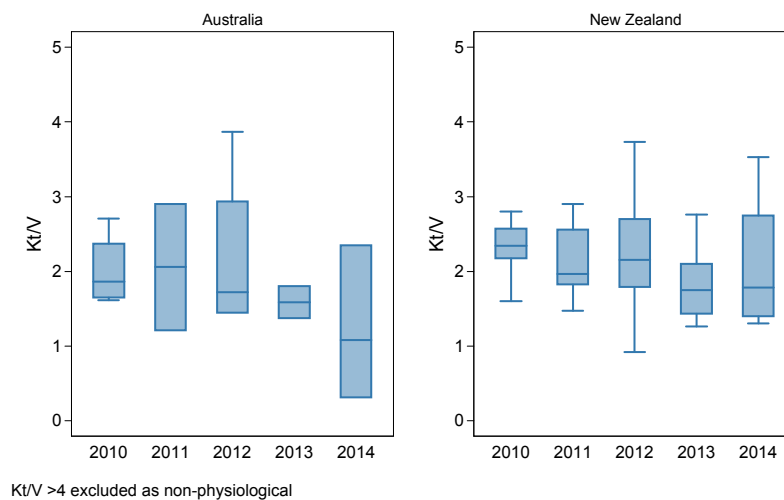


Table 11.4. Proportion of Prevalent Patients for whom URR or Kt/V was reported 2010-2014

Country	Modality	2010	2011	2012	2013	2014
Australia	Haemodialysis	96%	63%	65%	76%	72%
	Peritoneal Dialysis	10%	5%	10%	6%	8%
New Zealand	Haemodialysis	100%	80%	86%	100%	100%
	Peritoneal Dialysis	90%	92%	80%	64%	80%

Figure 11.5.1

Ferritin, December 2010-2014
Australia

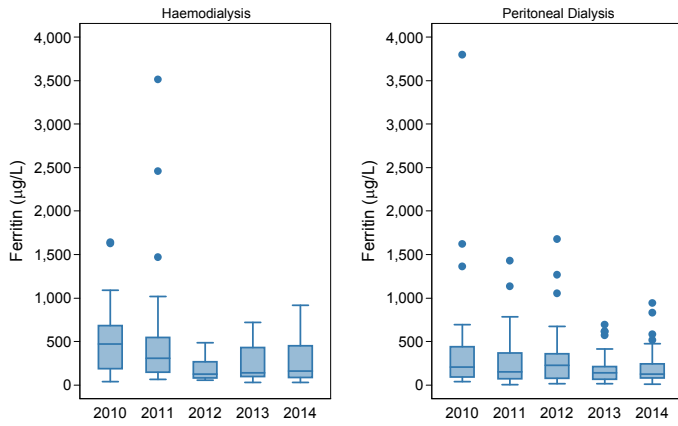


Figure 11.5.2

Ferritin, December 2010-2014
New Zealand

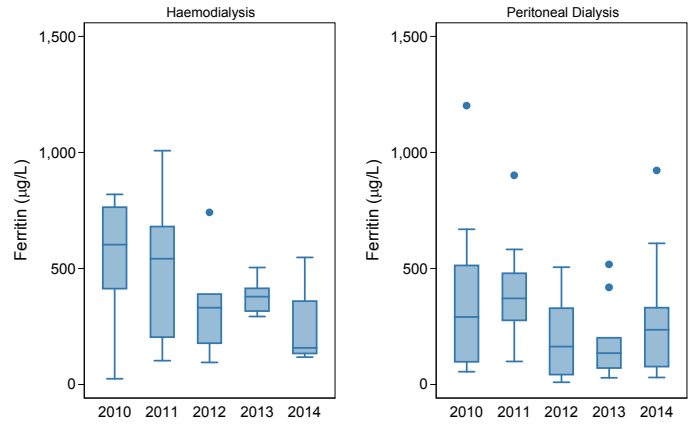


Figure 11.6.1

Transferrin Saturation, December 2010-2014
Australia

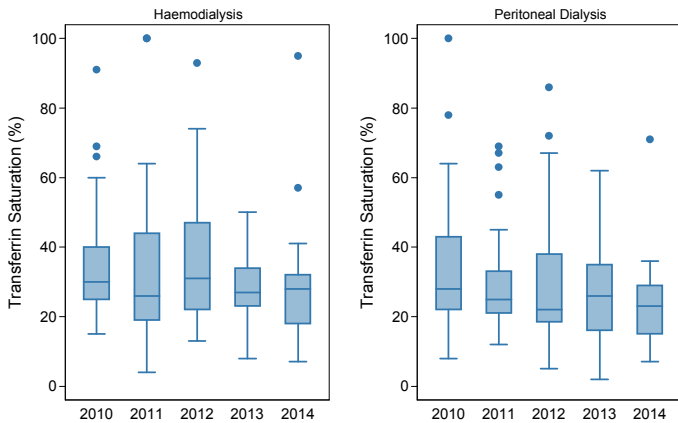


Figure 11.6.2

Transferrin Saturation, December 2010-2014
New Zealand

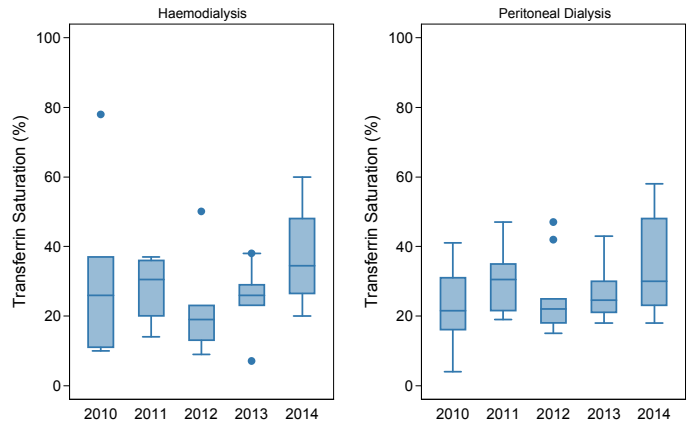


Figure 11.7.1

Serum Calcium, December 2010-2014
Australia

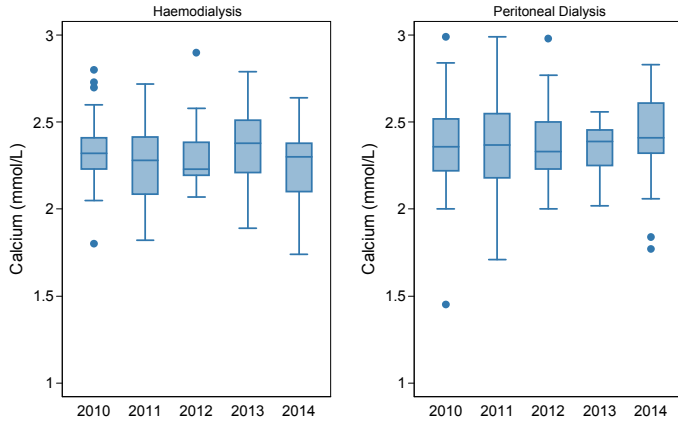
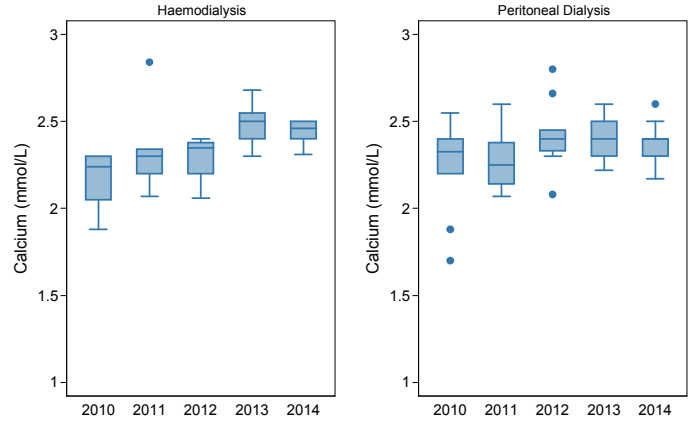


Figure 11.7.2

Serum Calcium, December 2010-2014
New Zealand



For HD patients, Serum Phosphate is reported from a pre-dialysis specimen of a mid-week session.

Figure 11.8.1

Serum Phosphate, December 2010-2014
Australia

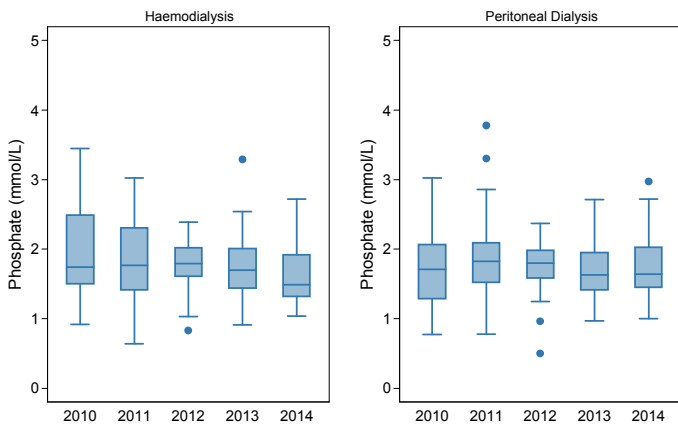
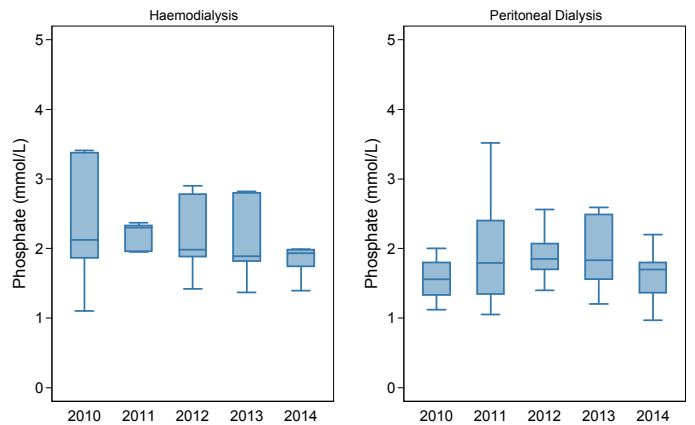


Figure 11.8.2

Serum Phosphate, December 2010-2014
New Zealand



Haemodialysis

Figure 11.9 and 11.10 summarise the recent trends in HD prescription among paediatric patients.

Figure 11.9

**Mean Sessions per Week (95% CI)
Among Haemodialysis Patients
December 2010-2014**

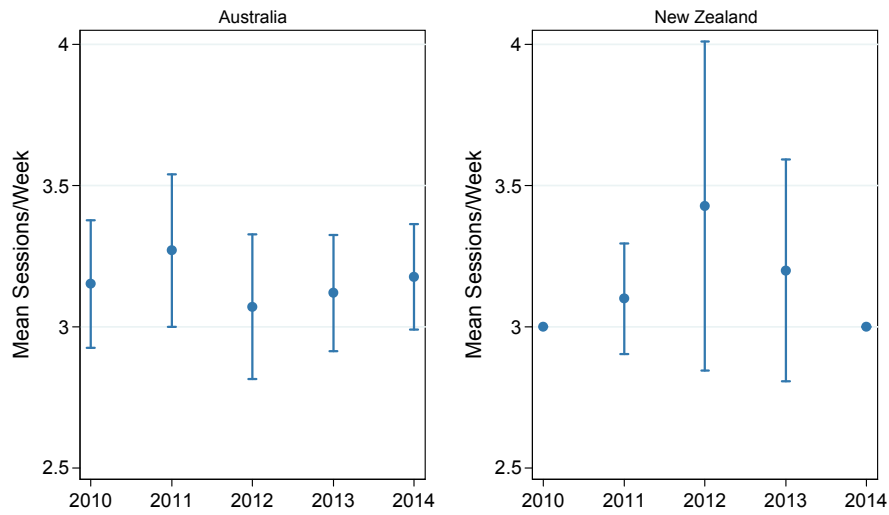
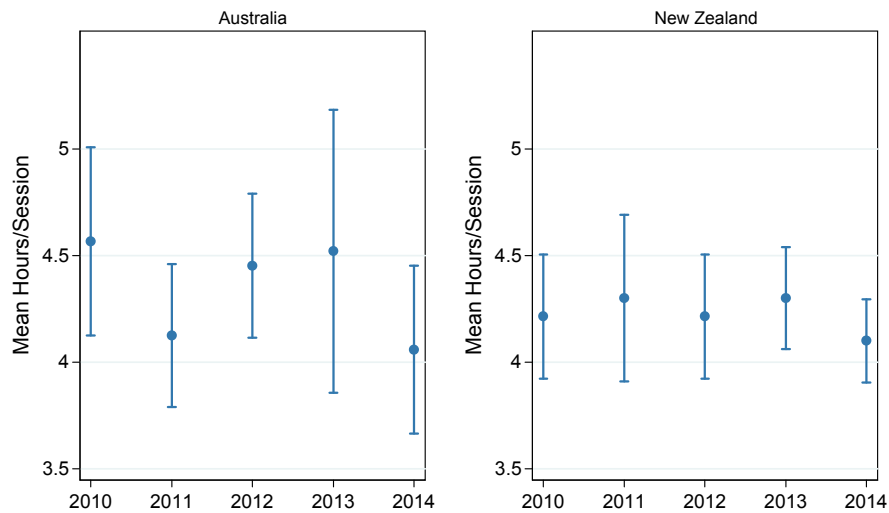


Figure 11.10

**Mean Hours per Session (95% CI)
Among Haemodialysis Patients
December 2010-2014**



Vascular Access

Vascular access for haemodialysis is summarised in Figures 11.13 -11.14.

Figure 11.13.1

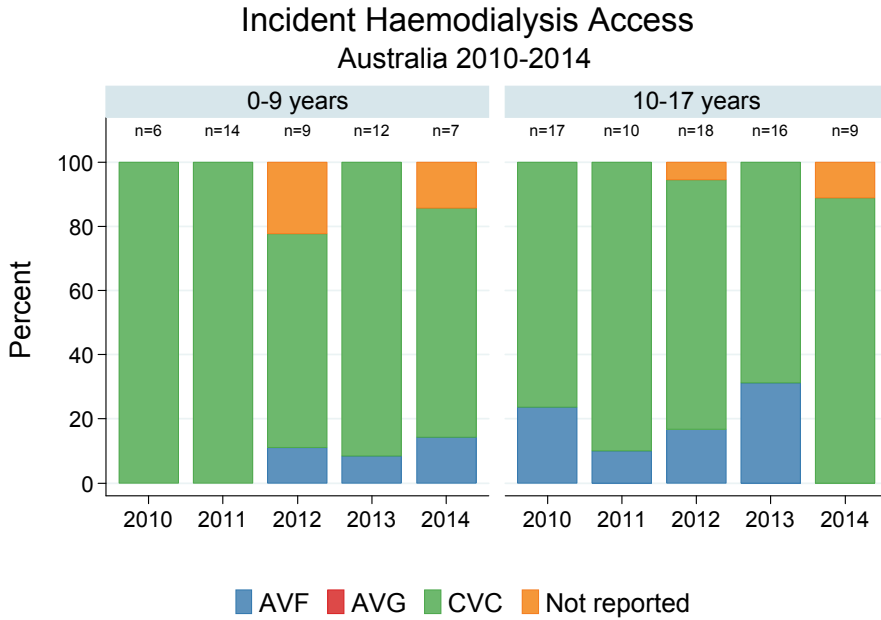


Figure 11.13.2

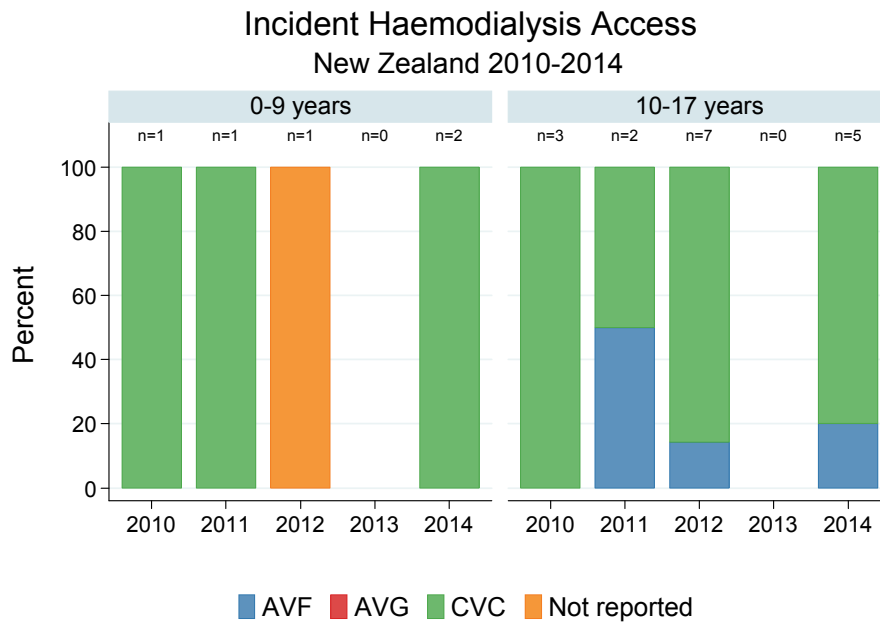


Figure 11.14.1

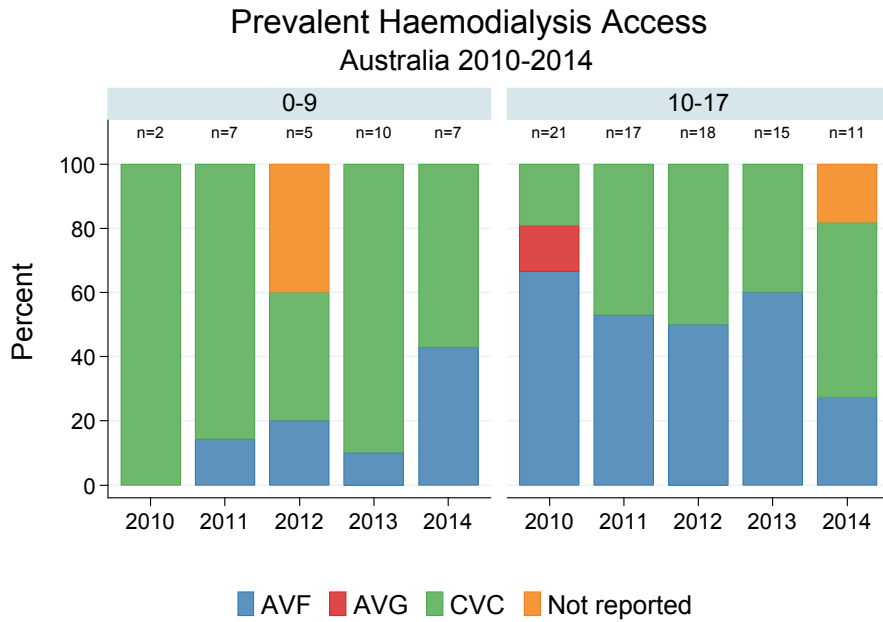
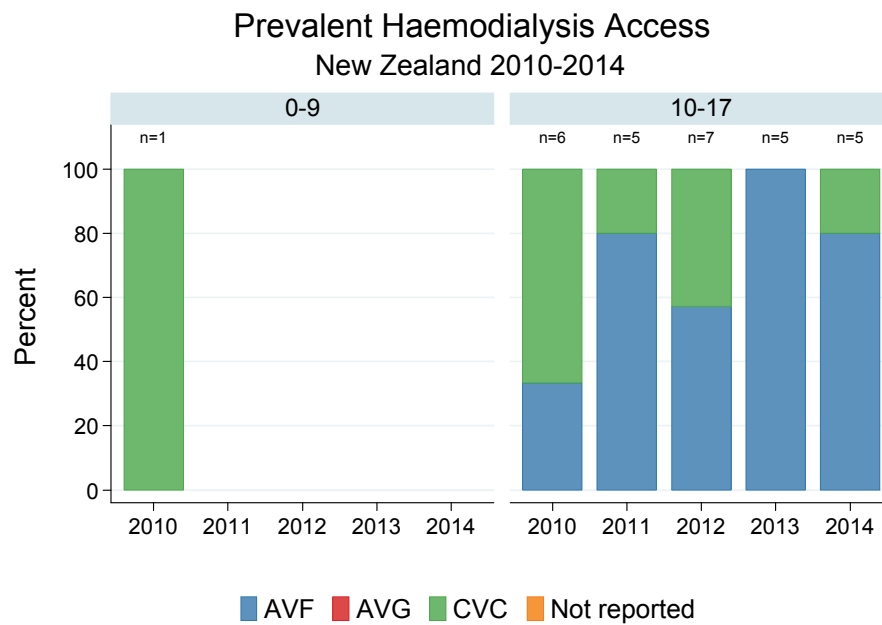


Figure 11.14.2



Peritoneal Dialysis

PD technique survival, censored for transplantation, loss to follow-up and recovery of renal function is presented below. The numbers available for analysis after the first year drop significantly in each age group in both countries, due to transplantation. Of the 241 patients, 68

(28%) received a transplant within one year of commencement of RRT. By two years a total of 114 (47%) of patients had received transplants.

Use of PD solutions is shown in Table 11.5.

Figure 11.15.1

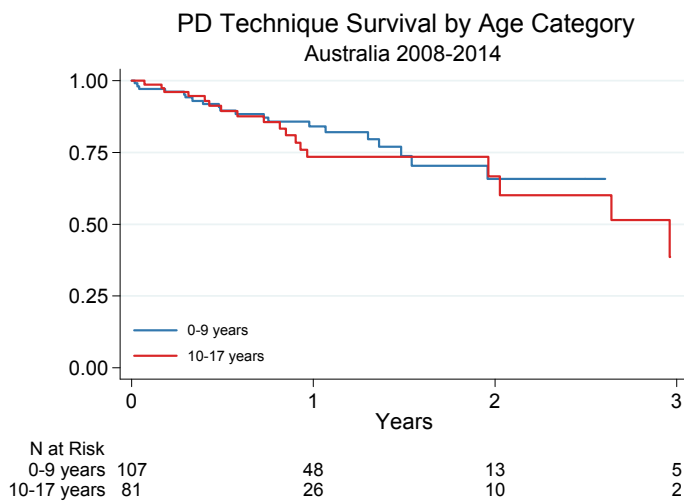


Figure 11.15.2

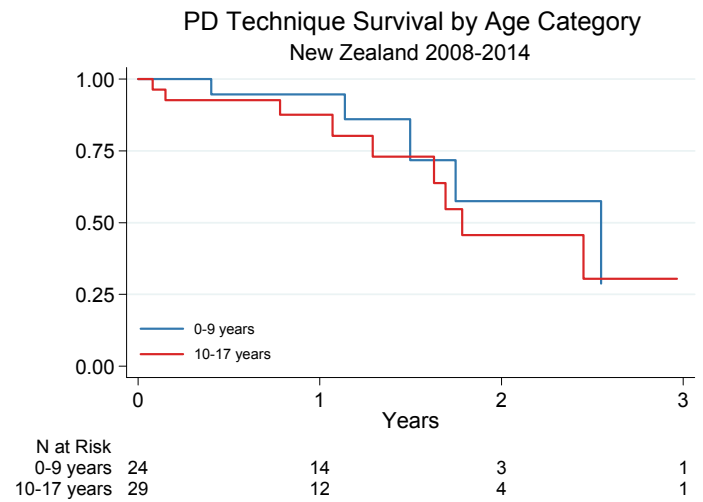


Table 11.5 Use of PD Solutions 2011-2014

PD solution	Australia				New Zealand			
	2011	2012	2013	2014	2011	2012	2013	2014
	(n = 40)	(n = 39)	(n = 35)	(n = 39)	(n = 13)	(n = 10)	(n = 11)	(n = 10)
Glucose	28 (70%)	35 (90%)	32 (91%)	35 (90%)	12 (92%)	10 (100%)	10 (91%)	9 (90%)
Icodextrin	6 (15%)	9 (23%)	8 (23%)	8 (21%)	2 (15%)	3 (30%)	2 (18%)	1 (10%)
Low GDP Lactate	11 (28%)	5 (13%)	5 (14%)	8 (21%)	10 (77%)	5 (50%)	5 (45%)	9 (90%)
Low GDP Bicarbonate	6 (15%)	4 (10%)	1 (3%)	0 (0%)	0 (0%)	0 (0%)	1 (9%)	0 (0%)

Peritonitis

Time from commencement of PD to first peritonitis tends to be slightly shorter in younger patients.

peritonitis rates, although it has not been as great as seen in the adult PD population (chapter 5).

The last few years have seen an improvement in

Figure 11.16

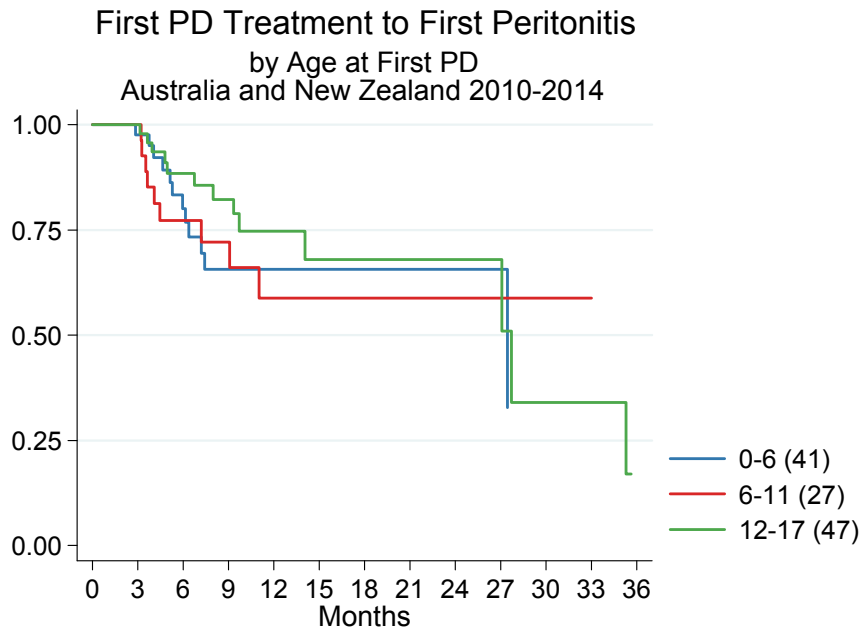
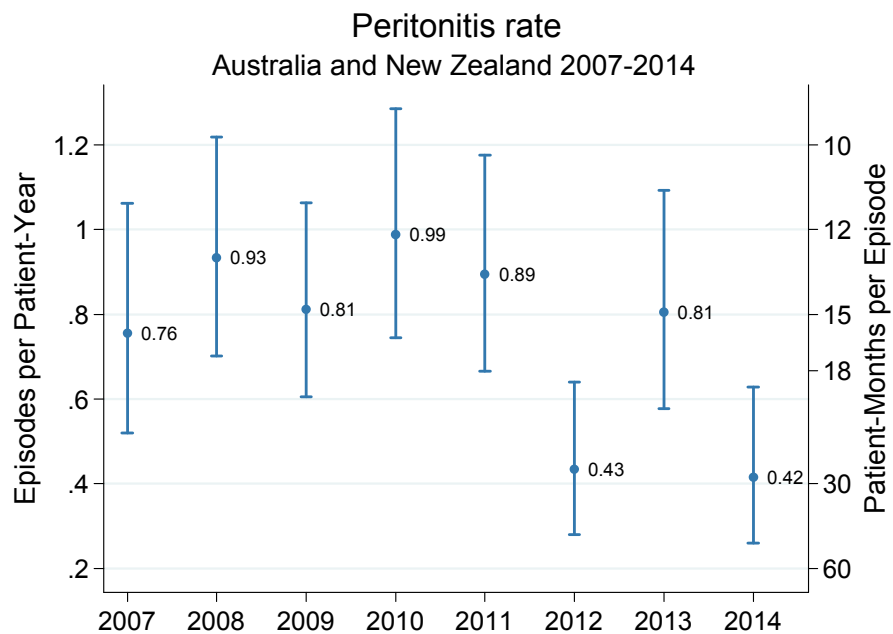


Figure 11.17



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