

Dialysis Outcomes in Australian Adolescents and Young Adults

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Introduction and Objectives

Adolescents and Young Adults (AYA) represent a small proportion of patients with end-stage kidney disease in Australia. While 10,341 patients were receiving dialysis on 31 December 2009¹, only 180 were aged between 15 and 25 years². More received HD than PD². The challenges of dialysis differ markedly in AYA compared to adults and younger children, yet little has been published on this group.

This study was undertaken to

- Describe demographic characteristics of AYA aged between 13 and 20 years between 2000 and 2013 receiving dialysis in Australia
- Examine association between dialysis modality and outcomes including complications

Methods

Demographic and clinical data were retrieved from the Australian and New Zealand Dialysis and Transplant Registry on all AYA aged 13-20 years who commenced dialysis between 1/1/2000 and 31/12/2013. One patient who received a single episode of HD on the day of renal transplantation was excluded.

Residential status was classified from patient postcode using the Australian Bureau of Statistics remote area index³.

Approval was given by the UNSW Human Research Ethics Advisory Panel. Data were analysed using SAS 9.4 for Windows (SAS Institute, Cary, NC, USA). Statistical significance was set at $p < 0.05$.

Results

300 AYA commenced dialysis during the study period (table 1). HD was the initial dialysis modality in 201 patients (67%) and was preferred in all states apart from Queensland, where PD and HD were used equally ($p = 0.0001$, figure 1.)

Mean haemoglobin level was significantly lower in patients on HD compared to PD within the first year of starting dialysis (105.9 18.3 vs 112.2 18.6 g/dL, $p = 0.005$).

There were no significant differences in transferrin saturations, calcium, or phosphate levels or use of Erythropoiesis Stimulating Agents.

Vascular access for most HD patients was via an AV fistula (figure 2).

Peritonitis was less likely in AYA from:

- major urban areas compared to more remote areas ($p = 0.002$, figure 3)
- paediatric centres compared to adult centres (19.6% vs 43.2%, $p = 0.002$)

228 (76%) AYA received at least one renal transplant during the study period. There was no difference in the time to transplantation according to initial dialysis modality.

		Study Group Median(IQR) or N(%)	HD n=201 Median(IQR) or N(%)	PD n=99 Median(IQR) or N(%)	HD v PD p-value
Age (yrs)		17.2 (15.6 - 18.6)	17.4 (15.9, 18.6)	16.8 (15.2, 18.6)	0.07
Height (cm) ¹		163 (158 - 171.7)	163 (156.4, 172)	163 (155.6, 169)	0.36
Weight (kg) ²		55.8 (47 - 69.)	57 (47.8, 72.1)	53.2 (45, 62.7)	0.02
BMI (kg/m ²) ²		20.3 (18.1, 24.6)	20.6 (18.6, 25.5)	20.0 (17.2, 22.9)	0.01
Gender	Female	142 (47.4)	101 (50.2)	41 (41.4)	0.15
Race ¹	Caucasoid	219 (73.5)	141 (70.1)	78 (80.4)	0.07
	ATSI	27 (9.1)	23 (11.4)	4 (4.1)	
	Other	52 (17.4)	36 (17.9)	16 (16.5)	
Primary Disease ³	GN	126 (42.9)	88 (44.7)	38 (39.2)	0.06
	Urological	63 (21.4)	38 (19.3)	25 (25.8)	
	Reflux nephropathy	38 (12.9)	21 (10.7)	17 (17.5)	
	Other	19 (6.5)	17 (8.6)	8 (8.2)	
	Hypoplasia/Dysplasia	22 (7.5)	9 (4.6)	6 (6.2)	
	Alports	16 (5.4)	14 (7.1)	2 (2.1)	
	Medullary Cystic Dis.	13 (4.4)	8 (4.1)	5 (5.2)	
	PKD	4 (1.4)	1 (0.5)	3 (3.1)	
	Other	50 (17.0)	37 (17.3)	13 (13.4)	
Initial Centre	Paediatric	128 (42.7)	84 (41.8)	44 (44.4)	
	Adult	172 (57.3)	117 (58.2)	55 (55.6)	
Late Referral ⁴	Yes	95 (32.0)	69 (34.8)	26 (26.3)	0.13
	No	202 (68.0)	129 (65.2)	73 (73.7)	
Remoteness ⁴	Major City	218 (72.9)	145 (72.5)	73 (71.7)	0.6
	Inner Regional	42 (14.0)	26 (13)	16 (16.2)	
	Outer Regional	24 (8.0)	17 (8.5)	7 (7.1)	
	Remote	15 (5.0)	12 (6.0)	3 (3.0)	
Period of Study	Early	114 (38.0)	82 (40.8)	32 (32.3)	0.15
	Late	186 (62.0)	119 (59.2)	67 (67.7)	

¹ n=298; ² n=299; ³ n=294; ⁴ n=297; PKD = Polycystic Kidney Disease; Early = 1/1/00 - 31/12/04; Late = 1/1/05 - 31/12/13

Table 1. Characteristics of AYA commencing dialysis in Australia between 1/1/2000 and 31/12/2013 by initial dialysis modality

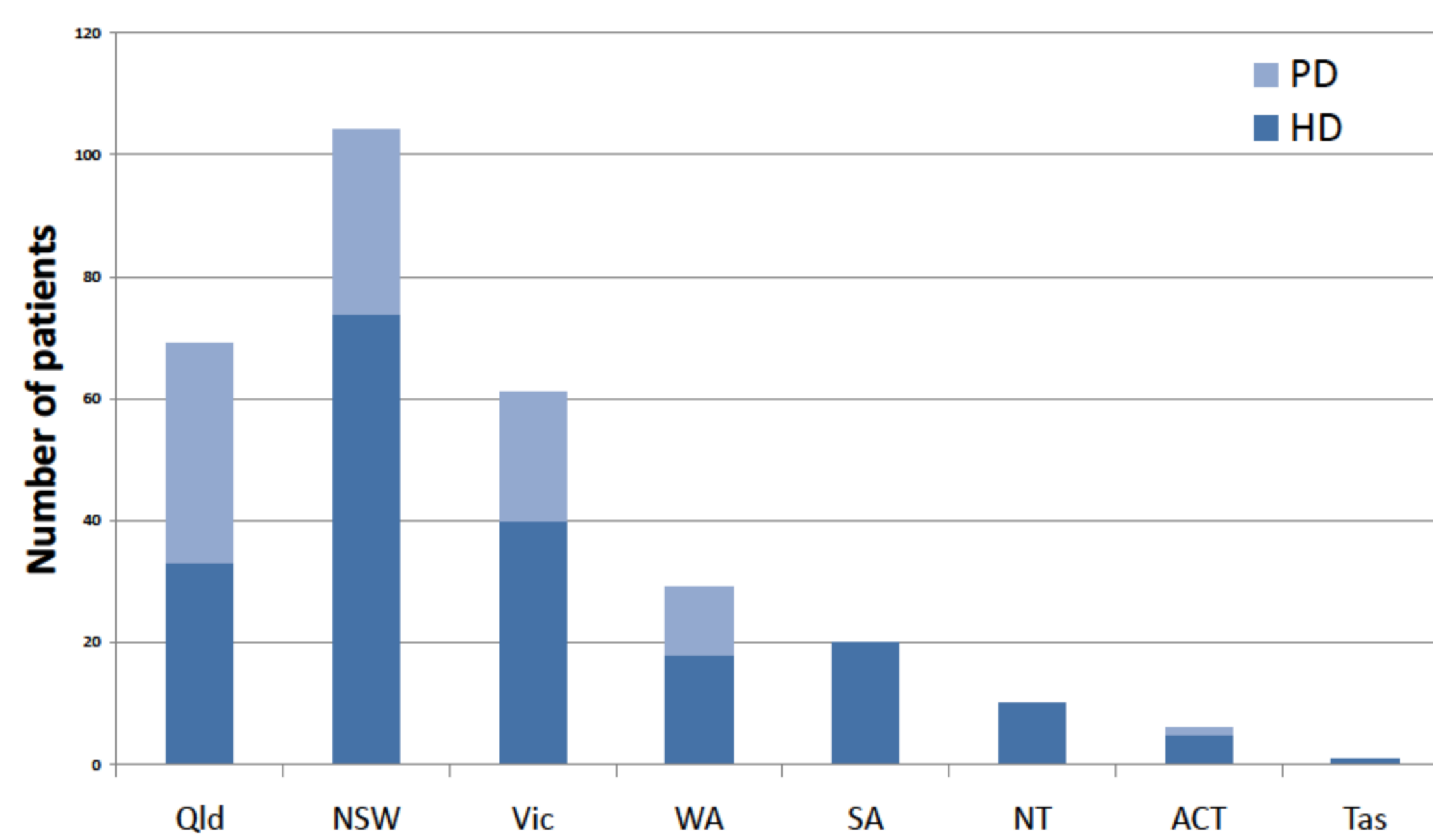


Figure 1. Dialysis modality by Australian state / territory $p = 0.0001$, comparing Qld to all other states/territories

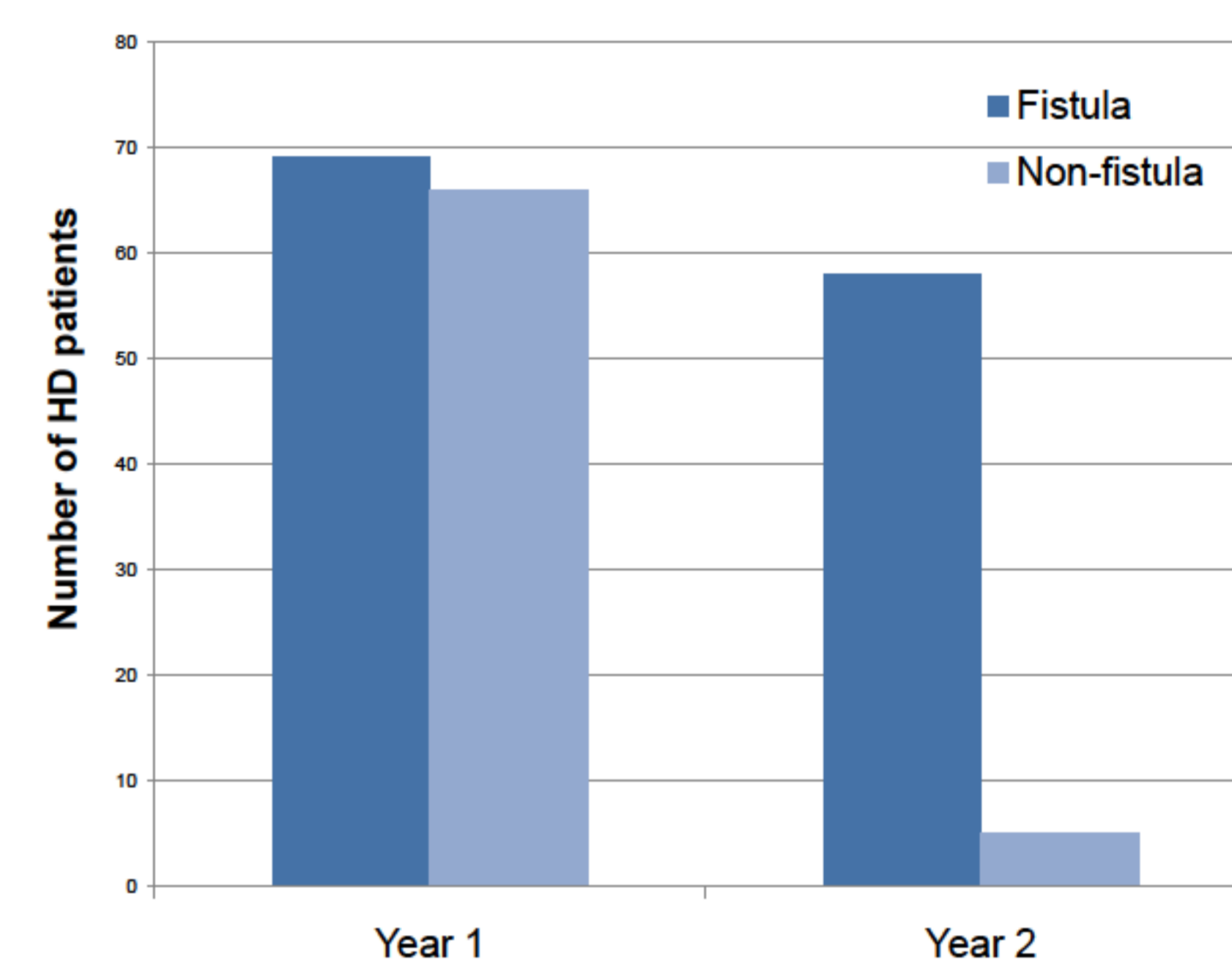


Figure 2. Vascular access $p < 0.0001$ comparing proportion with fistula in years 1 and 2

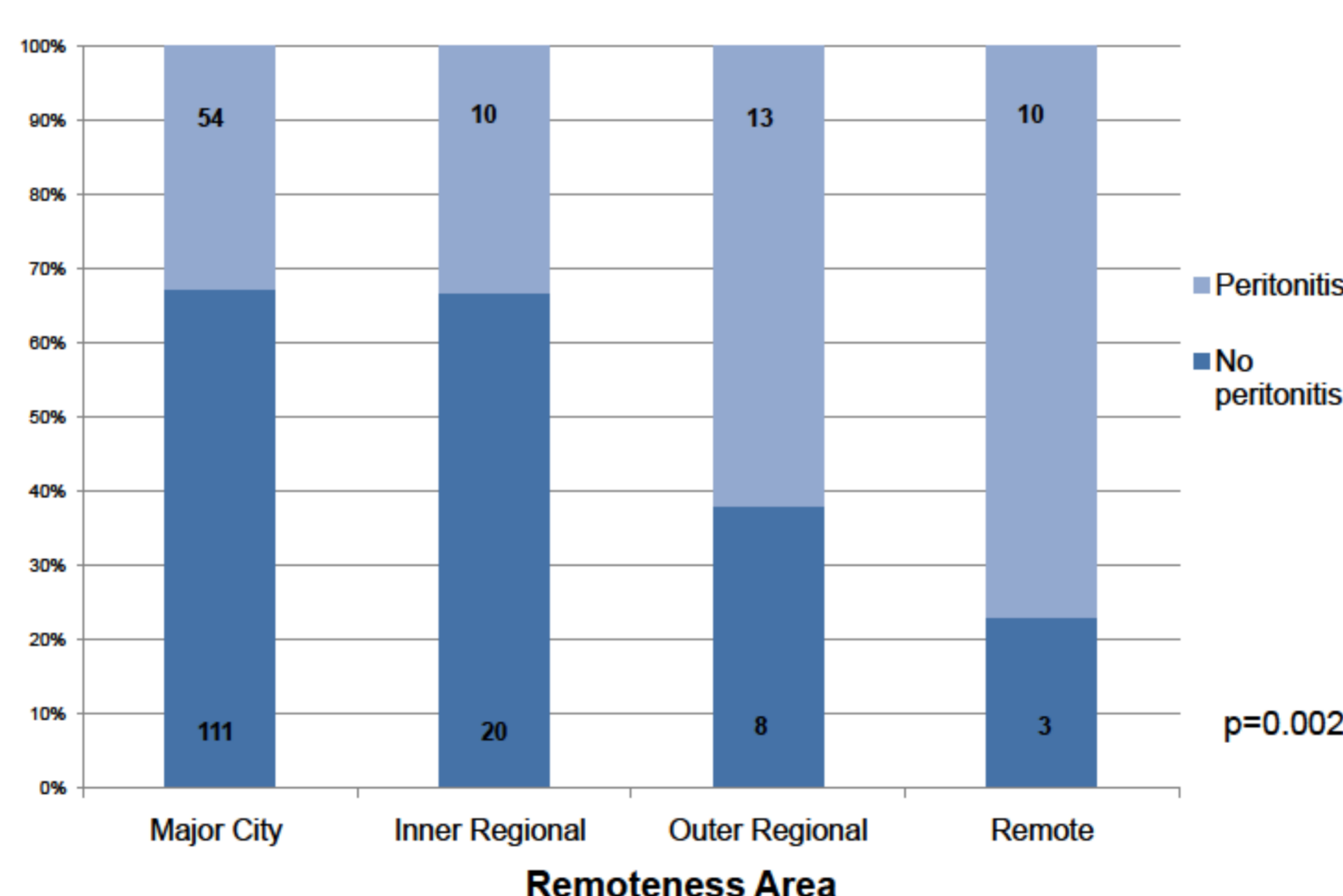


Figure 3. Proportion of patients with a first peritonitis episode by remoteness area $p = 0.002$

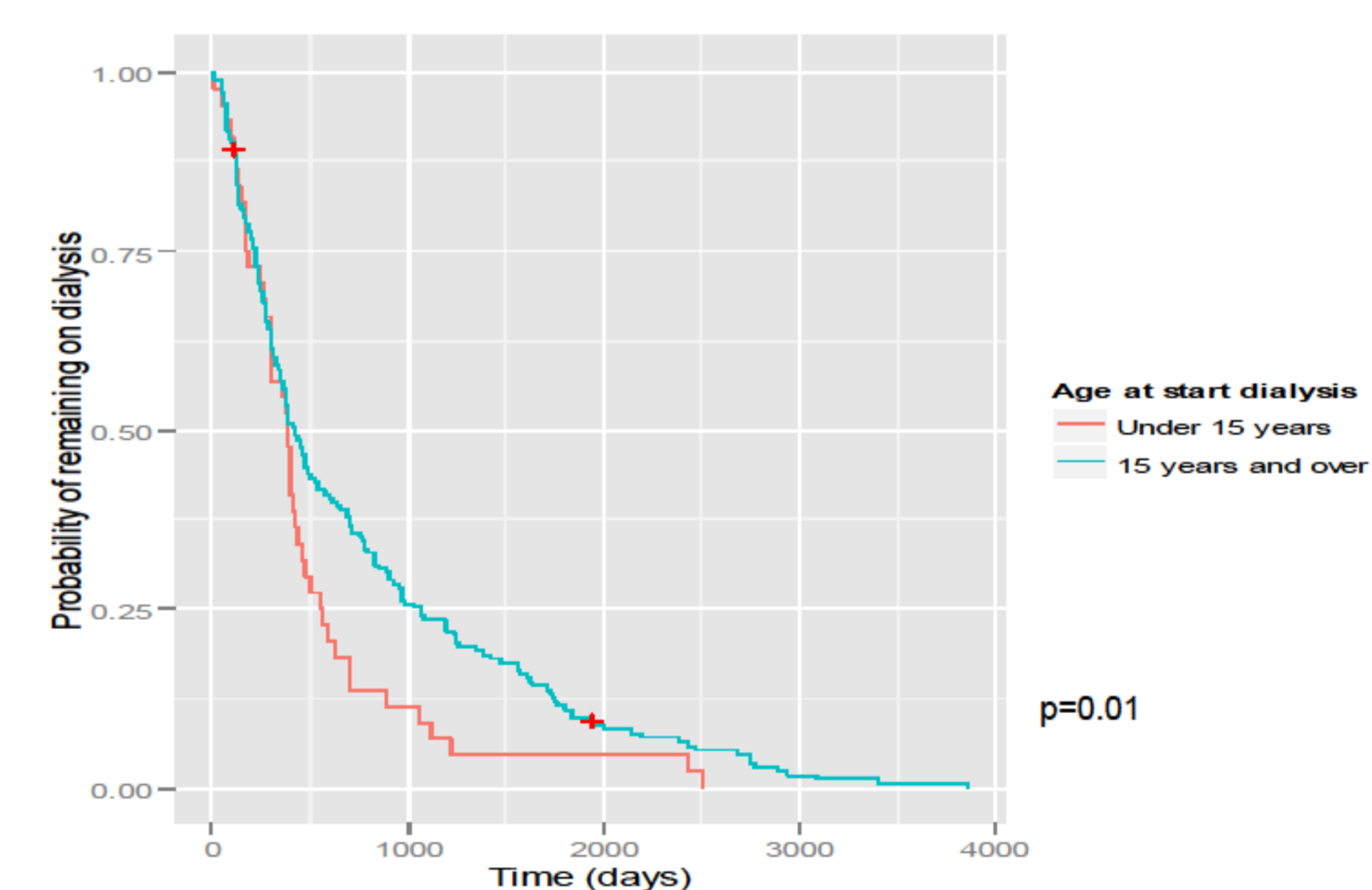


Figure 4. Time to transplantation by patient age $p = 0.01$

Median time to transplantation was significantly shorter in AYA:

- in paediatric centres compared to adult centres (12.4 months vs 16 months, $p = 0.003$)
- starting dialysis <15 years of age compared to ≥ 15 years of age (12.7 months vs 13.7 months, $p = 0.01$, figure 4)

Significantly fewer HD patients attended school full time in the first year of dialysis than patients managed on PD ($p = 0.002$)

Conclusions

HD is used more often as the initial dialysis modality in Australian AYA. The choice of dialysis modality does not appear to be influenced by patient characteristics, nor dialysis outcomes. HD is preferred in spite of better school attendance with PD. Future research is required to determine the optimal method of dialysis for this age group. Such information is essential to allow patients, their families and clinicians to make evidence-based decisions about care.

References: 1. Briggs N, Excell L, McDonald S. Method and Location of Dialysis. ANZDATA Registry Report 2010. Adelaide, South Australia: ANZDATA Registry. 2. Ritchie AG, Clayton PA, Mackie FE, Kennedy SE. Nationwide survey of adolescents and young adults with end-stage kidney disease. Nephrology (Carlton, Vic). 2012;17(6):539-44; 3. Pink B. Australian Standard Geographical Classification: Local Government Areas and Statistical Local Areas. ABS; 2011.

