



# CHAPTER 6

## Australian Transplant Waiting List

*Reporting the deceased donor kidney transplant waiting list dynamics in Australia, the demographics of patients on the waiting list, and transplantation rates and survival for wait listed patients.*

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### Suggested citation

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<http://www.anzdata.org.au>

## Waiting List Dynamics

The waiting list data reported here are derived from the Australian National Organ Matching System (NOMS) and ANZDATA, and only relate to wait-listing for deceased donor (DD) kidney-only transplants. Patients wait-listed for multi-organ transplants are excluded. Recipients of living donor (LD) transplants may or may not be on the waiting list prior to transplantation.

To understand the relative contributions of deceased and living donor transplants to patients on (and off) the kidney-only waiting list, LD transplants to recipients not on the kidney-only waiting list are also included.

The numbers of people moving on and off the active waiting list for any reason are shown. Patients are categorised as either active or off the list - an "interim" or "temporarily off list" status is considered to be off list, since these patients will not be allocated kidneys. A number of de-listed patients may return to the list in subsequent years. If a patient was listed and de-listed more than once in a calendar year, only the net change is counted.

Table 6.1 shows the waiting list dynamics tables for Australia for each year. The recent increase in deceased organ donor numbers has been matched by an increase in the number of patients being listed, such that overall numbers on the waiting list are stable. LD transplants performed in patients who were not on the DD waiting list are not included in this table.

**Table 6.1 Australian Kidney Transplant Waiting List Dynamics 2013-2018**

Event	2013	2014	2015	2016	2017	2018
Active start of year	1078	1076	1145	1071	953	965
Made active	778	854	767	823	963	998
Taken off list	141	148	156	135	144	146
DD graft	581	572	633	759	751	811
LD graft	54	56	42	37	45	34
Overseas graft	1	0	2	1	1	0
Died on list	3	9	8	9	10	6
Active end of year	1076	1145	1071	953	965	966

Table 6.2 shows data for non-Indigenous and Indigenous patients respectively.

**Table 6.2 Australian Kidney Transplant Waiting List Dynamics by Ethnicity 2013-2018**

Ethnicity	Event	2013	2014	2015	2016	2017	2018
Non-Indigenous	Active start of year	1042	1036	1103	1025	901	913
	Made active	738	801	711	764	903	899
	Taken off list	137	137	144	127	134	138
	DD graft	551	532	594	719	703	740
	LD graft	53	56	41	32	43	33
	Overseas graft	1	0	2	1	1	0
	Died on list	2	9	8	9	10	5
	Active end of year	1036	1103	1025	901	913	896
Indigenous	Active start of year	34	36	32	31	32	31
	Made active	37	44	40	39	39	65
	Taken off list	4	11	10	7	8	8
	DD graft	29	37	31	30	32	44
	LD graft	1	0	0	1	0	0
	Overseas graft	0	0	0	0	0	0
	Died on list	1	0	0	0	0	1
	Active end of year	36	32	31	32	31	43
Not reported	Active start of year	2	4	10	15	20	21
	Made active	3	9	16	20	21	34
	Taken off list	0	0	2	1	2	0
	DD graft	1	3	8	10	16	27
	LD graft	0	0	1	4	2	1
	Overseas graft	0	0	0	0	0	0
	Died on list	0	0	0	0	0	0
	Active end of year	4	10	15	20	21	27

The numbers of both dialysis patients and transplants vary with age; in table 6.3 the waiting list dynamics for the years 2013-2018 is shown by broad age groups.

**Table 6.3 Australian Kidney Transplant Waiting List Dynamics by Age 2013-2018**

Age	Event	2013	2014	2015	2016	2017	2018
0-17	Active start of year	7	13	13	17	25	18
	Made active	22	20	17	31	27	35
	Taken off list	0	2	1	1	3	2
	DD graft	15	16	12	20	29	27
	LD graft	1	2	0	1	2	1
	Overseas graft	0	0	0	0	0	0
	Died on list	0	0	0	1	0	0
	Active end of year	13	13	17	25	18	23
18-44	Active start of year	263	306	329	343	297	319
	Made active	212	218	231	231	281	313
	Taken off list	26	41	34	45	30	39
	DD graft	122	128	169	214	202	214
	LD graft	20	26	13	17	23	24
	Overseas graft	0	0	1	0	1	0
	Died on list	1	0	0	1	3	3
	Active end of year	306	329	343	297	319	352
45-54	Active start of year	248	263	281	261	241	248
	Made active	186	195	173	202	245	258
	Taken off list	28	39	44	26	38	38
	DD graft	129	126	138	185	186	209
	LD graft	14	10	8	9	11	2
	Overseas graft	0	0	1	0	0	0
	Died on list	0	2	2	2	3	0
	Active end of year	263	281	261	241	248	257
55-64	Active start of year	332	299	323	292	257	258
	Made active	202	254	229	221	279	282
	Taken off list	43	38	40	42	48	43
	DD graft	177	179	206	207	220	246
	LD graft	13	10	10	5	7	5
	Overseas graft	1	0	0	1	0	0
	Died on list	1	3	4	1	3	2
	Active end of year	299	323	292	257	258	244
65+	Active start of year	228	195	199	158	133	122
	Made active	156	167	117	138	131	110
	Taken off list	44	28	37	21	25	24
	DD graft	138	123	108	133	114	115
	LD graft	6	8	11	5	2	2
	Overseas graft	0	0	0	0	0	0
	Died on list	1	4	2	4	1	1
	Active end of year	195	199	158	133	122	90

Differences between transplanting regions are shown in table 6.4. Waiting list numbers in each region are reflective of both listing practices and donation rates, both current and historical.

**Table 6.4 Australian Kidney Transplant Waiting List Dynamics by State 2013-2018**

State	Event	2013	2014	2015	2016	2017	2018
NSW/ACT	Active start of year	534	478	511	444	361	378
	Made active	227	293	240	227	329	316
	Taken off list	75	70	70	66	64	52
	DD graft	167	151	207	219	215	251
	LD graft	38	36	23	21	29	17
	Overseas graft	0	0	2	0	1	0
	Died on list	3	3	5	4	3	4
	Active end of year	478	511	444	361	378	370
VIC/TAS	Active start of year	340	383	393	382	385	366
	Made active	268	278	254	295	299	322
	Taken off list	45	55	52	39	57	62
	DD graft	166	192	200	234	244	297
	LD graft	13	16	11	14	11	10
	Overseas graft	1	0	0	1	0	0
	Died on list	0	5	2	4	6	0
	Active end of year	383	393	382	385	366	319
QLD	Active start of year	106	112	117	126	104	107
	Made active	128	130	133	155	178	194
	Taken off list	14	10	20	16	14	18
	DD graft	108	114	99	161	159	146
	LD graft	0	1	5	0	2	3
	Overseas graft	0	0	0	0	0	0
	Died on list	0	0	0	0	0	0
	Active end of year	112	117	126	104	107	134
SA/NT	Active start of year	56	64	65	75	62	82
	Made active	81	80	91	75	85	85
	Taken off list	2	10	8	10	7	11
	DD graft	68	66	69	76	55	52
	LD graft	3	2	3	2	2	4
	Overseas graft	0	0	0	0	0	0
	Died on list	0	1	1	0	1	1
	Active end of year	64	65	75	62	82	99
WA	Active start of year	42	39	59	44	41	32
	Made active	74	73	49	71	72	81
	Taken off list	5	3	6	4	2	3
	DD graft	72	49	58	69	78	65
	LD graft	0	1	0	0	1	0
	Overseas graft	0	0	0	0	0	0
	Died on list	0	0	0	1	0	1
	Active end of year	39	59	44	41	32	44

Table 6.5 shows the same data by blood group. Turnover is highest for blood group AB patients.

**Table 6.5 Australian Kidney Transplant Waiting List Dynamics by Blood Group 2013-2018**

Blood Group	Event	2013	2014	2015	2016	2017	2018
<b>A</b>	Active start of year	310	326	329	312	242	252
	Made active	290	311	301	301	328	348
	Taken off list	39	56	40	29	36	31
	DD graft	212	224	255	322	273	331
	LD graft	20	25	19	18	8	8
	Overseas graft	0	0	1	0	1	0
	Died on list	3	3	3	2	0	3
	Active end of year	<b>326</b>	<b>329</b>	<b>312</b>	<b>242</b>	<b>252</b>	<b>227</b>
<b>AB</b>	Active start of year	20	21	24	17	24	27
	Made active	24	37	37	32	46	47
	Taken off list	3	2	2	0	2	1
	DD graft	20	32	41	25	41	56
	LD graft	0	0	1	0	0	2
	Overseas graft	0	0	0	0	0	0
	Died on list	0	0	0	0	0	0
	Active end of year	<b>21</b>	<b>24</b>	<b>17</b>	<b>24</b>	<b>27</b>	<b>15</b>
<b>B</b>	Active start of year	179	178	210	187	175	188
	Made active	102	128	97	117	144	148
	Taken off list	23	19	32	23	34	36
	DD graft	77	66	83	97	84	95
	LD graft	3	10	3	7	10	5
	Overseas graft	0	0	0	0	0	0
	Died on list	0	1	2	2	3	1
	Active end of year	<b>178</b>	<b>210</b>	<b>187</b>	<b>175</b>	<b>188</b>	<b>199</b>
<b>O</b>	Active start of year	569	551	582	555	512	498
	Made active	362	378	332	373	445	455
	Taken off list	76	71	82	83	72	78
	DD graft	272	250	254	315	353	329
	LD graft	31	21	19	12	27	19
	Overseas graft	1	0	1	1	0	0
	Died on list	0	5	3	5	7	2
	Active end of year	<b>551</b>	<b>582</b>	<b>555</b>	<b>512</b>	<b>498</b>	<b>525</b>

## Proportion of Patients Transplanted or on Waiting List

Figure 6.1 shows the proportion of prevalent renal replacement therapy patients who were either transplanted or actively wait-listed at the end of 2018, by state and age group. In all states and all age groups, the majority of dialysis patients were not actively wait-listed at the end of 2018.

Younger patients were more likely to be transplanted or wait-listed, and the proportion of dialysis patients wait-listed varied substantially by state.

**Figure 6.1 - Proportion of Patients Transplanted or on Waiting List - By State or Territory and Age, Dec 2018**

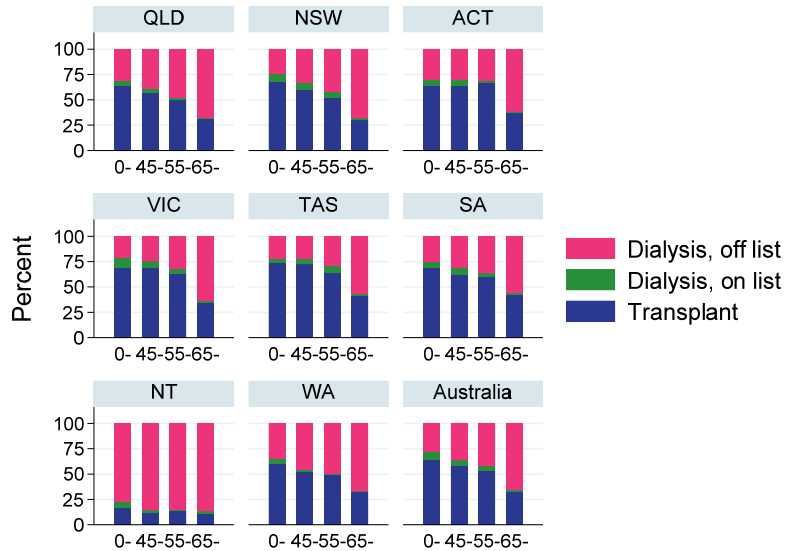
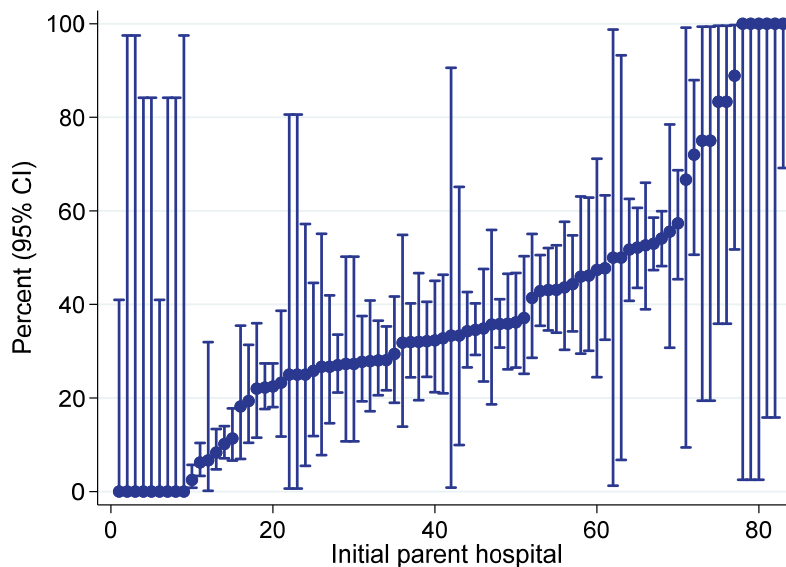


Figure 6.2 shows differences in access to the waiting list or transplantation, in incident patients, by treating hospital. This analysis is restricted to patients aged 18-60 who commenced renal replacement therapy in Australia over 2013-2017 and shows the proportion of these patients who had either been made active on the kidney transplant waiting list or received a kidney transplant within one year of starting RRT. The proportions varied from 0% to 100% suggesting substantial discrepancies in practice between treating hospitals.

**Figure 6.2 - Proportion of new RRT patients aged 18-60 who were wait-listed and/or transplanted within 1 year of commencing RRT Australia 2013-2017**



## Waiting List Demographics

Table 6.6 shows the demographic characteristics of actively wait-listed patients over 2013-2018. In general, the demographics are very stable.

**Table 6.6 Demographics of the Australian Kidney Transplant Waiting List 2013-2018**

Factor	2013	2014	2015	2016	2017	2018
<b>N</b>	1076	1145	1071	953	965	966
<b>Waiting time (years), median (IQR)</b>	2.6 (1.4, 4.5)	2.6 (1.4, 4.4)	2.4 (1.3, 4.1)	2.3 (1.4, 3.9)	2.2 (1.2, 3.6)	2.1 (1.2, 3.6)
<b>Blood group</b>						
<b>A</b>	326 (30.3%)	329 (28.7%)	312 (29.1%)	242 (25.4%)	252 (26.1%)	227 (23.5%)
<b>AB</b>	21 (2.0%)	24 (2.1%)	17 (1.6%)	24 (2.5%)	27 (2.8%)	15 (1.6%)
<b>B</b>	178 (16.5%)	210 (18.3%)	187 (17.5%)	175 (18.4%)	188 (19.5%)	199 (20.6%)
<b>O</b>	551 (51.2%)	582 (50.8%)	555 (51.8%)	512 (53.7%)	498 (51.6%)	525 (54.3%)
<b>Previous grafts</b>						
<b>0</b>	803 (74.6%)	839 (73.3%)	773 (72.2%)	690 (72.4%)	723 (74.9%)	733 (75.9%)
<b>1</b>	233 (21.7%)	253 (22.1%)	242 (22.6%)	215 (22.6%)	201 (20.8%)	196 (20.3%)
<b>2</b>	33 (3.1%)	46 (4.0%)	50 (4.7%)	42 (4.4%)	39 (4.0%)	35 (3.6%)
<b>3</b>	7 (0.7%)	7 (0.6%)	6 (0.6%)	6 (0.6%)	2 (0.2%)	2 (0.2%)
<b>Age (years)</b>						
<b>0-44</b>	364 (33.8%)	357 (31.2%)	360 (33.6%)	297 (31.2%)	300 (31.1%)	312 (32.3%)
<b>45-54</b>	278 (25.8%)	305 (26.6%)	261 (24.4%)	244 (25.6%)	237 (24.6%)	240 (24.8%)
<b>55-64</b>	294 (27.3%)	309 (27.0%)	292 (27.3%)	255 (26.8%)	261 (27.0%)	259 (26.8%)
<b>65+</b>	140 (13.0%)	174 (15.2%)	158 (14.8%)	157 (16.5%)	167 (17.3%)	155 (16.0%)
<b>Gender</b>						
<b>Male</b>	655 (60.9%)	712 (62.2%)	662 (61.8%)	595 (62.4%)	611 (63.3%)	582 (60.2%)
<b>Ethnicity</b>						
<b>Caucasian</b>	756 (70.3%)	772 (67.4%)	711 (66.4%)	586 (61.5%)	597 (61.9%)	547 (56.6%)
<b>Aboriginal/Torres Strait Islander</b>	36 (3.3%)	32 (2.8%)	31 (2.9%)	32 (3.4%)	31 (3.2%)	43 (4.5%)
<b>Asian</b>	200 (18.6%)	238 (20.8%)	209 (19.5%)	217 (22.8%)	196 (20.3%)	221 (22.9%)
<b>Māori</b>	13 (1.2%)	10 (0.9%)	8 (0.7%)	8 (0.8%)	8 (0.8%)	9 (0.9%)
<b>Pacific</b>	32 (3.0%)	35 (3.1%)	35 (3.3%)	32 (3.4%)	33 (3.4%)	35 (3.6%)
<b>Other</b>	35 (3.3%)	48 (4.2%)	62 (5.8%)	58 (6.1%)	70 (7.3%)	72 (7.5%)
<b>Not reported</b>	4 (0.4%)	10 (0.9%)	15 (1.4%)	20 (2.1%)	30 (3.1%)	39 (4.0%)
<b>Primary renal disease</b>						
<b>Diabetic Nephropathy</b>	146 (13.6%)	148 (12.9%)	139 (13.0%)	129 (13.5%)	138 (14.3%)	157 (16.3%)
<b>Glomerulonephritis</b>	436 (40.5%)	485 (42.4%)	450 (42.0%)	413 (43.3%)	401 (41.6%)	375 (38.8%)
<b>Hypertension</b>	86 (8.0%)	81 (7.1%)	74 (6.9%)	73 (7.7%)	74 (7.7%)	81 (8.4%)
<b>Polycystic Disease</b>	143 (13.3%)	141 (12.3%)	136 (12.7%)	109 (11.4%)	116 (12.0%)	120 (12.4%)
<b>Reflux Nephropathy</b>	88 (8.2%)	93 (8.1%)	83 (7.7%)	68 (7.1%)	65 (6.7%)	69 (7.1%)
<b>Other</b>	135 (12.5%)	149 (13.0%)	147 (13.7%)	121 (12.7%)	117 (12.1%)	113 (11.7%)
<b>Uncertain</b>	41 (3.8%)	47 (4.1%)	38 (3.5%)	30 (3.1%)	34 (3.5%)	38 (3.9%)
<b>Not reported</b>	1 (0.1%)	1 (0.1%)	4 (0.4%)	10 (1.0%)	20 (2.1%)	13 (1.3%)
<b>Comorbidities</b>						
<b>Diabetes</b>	227 (21.2%)	240 (21.0%)	237 (22.2%)	226 (23.8%)	216 (22.5%)	233 (24.1%)
<b>Coronary artery disease</b>	229 (21.4%)	211 (18.5%)	172 (16.1%)	194 (20.5%)	182 (18.9%)	181 (18.7%)
<b>Peripheral vascular disease</b>	123 (11.5%)	128 (11.2%)	97 (9.1%)	97 (10.2%)	95 (9.9%)	92 (9.5%)
<b>Cerebrovascular disease</b>	61 (5.7%)	77 (6.7%)	61 (5.7%)	56 (5.9%)	55 (5.7%)	54 (5.6%)
<b>Chronic lung disease</b>	110 (10.3%)	110 (9.6%)	97 (9.1%)	101 (10.7%)	91 (9.5%)	92 (9.5%)

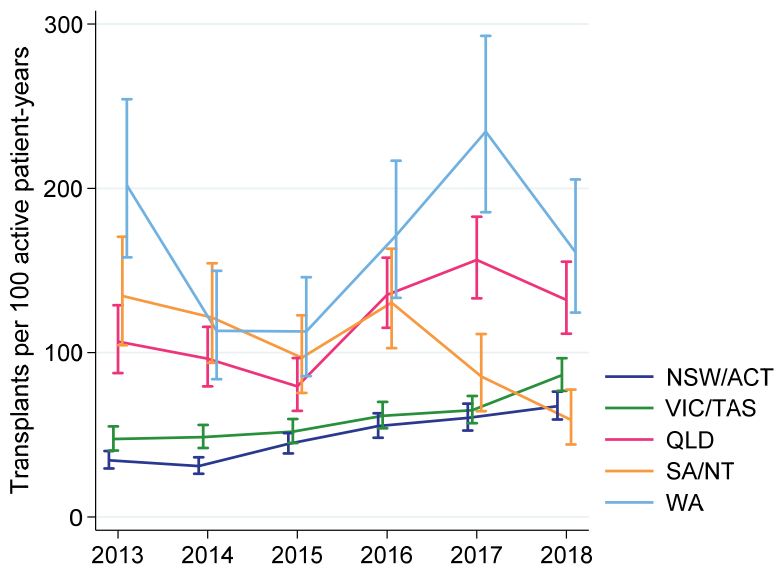


## Transplant Rate

The transplant rate represents the likelihood of receiving a kidney transplant in patients who are actively wait-listed. For these analyses the transplant rate was calculated as the number of deceased donor kidney-only transplants performed (numerator) per 100 patient-years on the active kidney-only waiting list (denominator). The transplant rate depends on the number of organs available, the number of patients on the waiting list, and the kidney allocation system. Figures 6.3-6.6 show the transplant rate by state, age, ethnicity and blood group respectively.

The transplant rate is typically highest in WA (figure 6.3).

**Figure 6.3 - Deceased Donor Transplant Rate by Transplanting Region - Per 100 Active Patient-Years**



Paediatric patients are preferentially allocated kidneys and so have historically had a higher transplant rate than adult patients. Since the allocation system otherwise ignores age, patients in other age groups have similar transplant rates (figure 6.4), and differences are likely to represent differences in acceptance of kidney offers. Indigenous patients are more likely to be listed in states with a higher donor rate, and thus have a higher transplant rate (figure 6.5).

**Figure 6.4 - Deceased Donor Transplant Rate by Age - Per 100 Active Patient-Years**

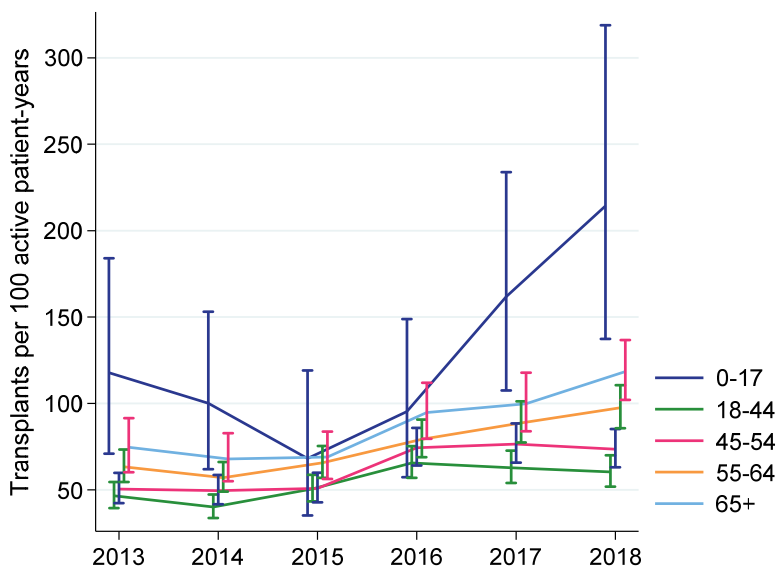
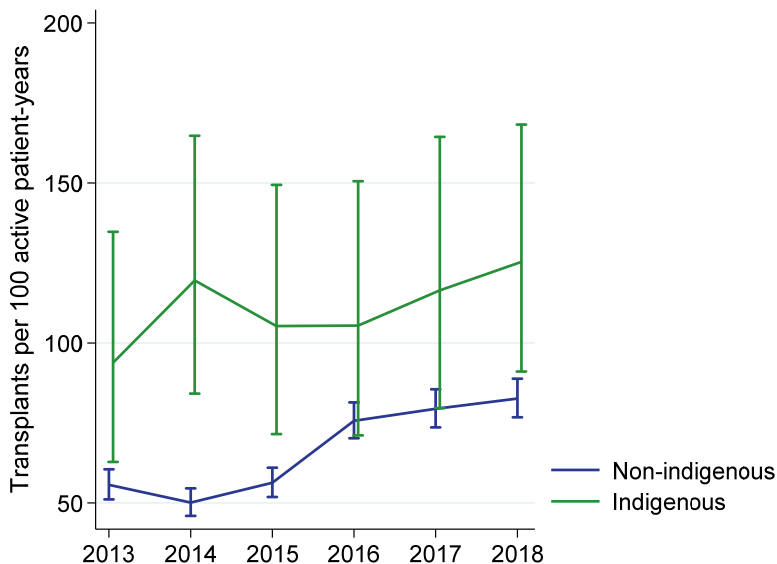
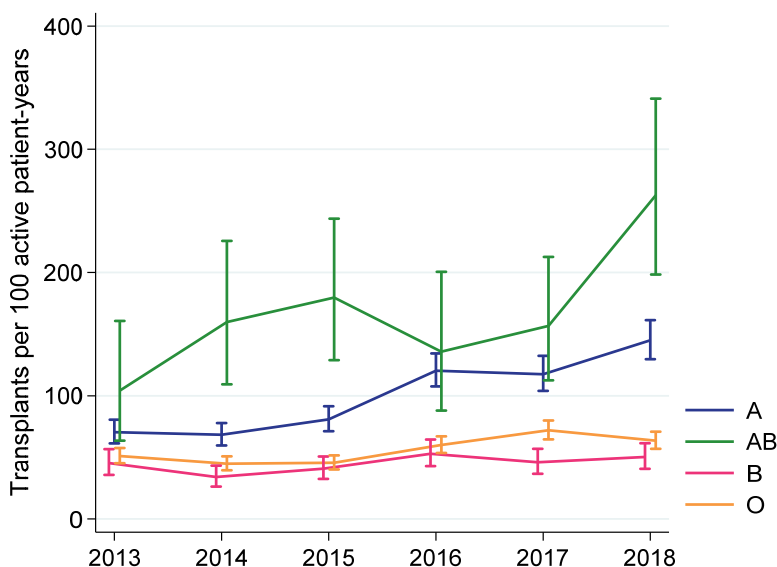


Figure 6.5 - Deceased Donor Transplant Rate by Ethnicity - Per 100 Active Patient-Years



Blood group AB patients have the highest transplant rate due to their compatibility with all donors (Figure 6.6).

Figure 6.6 - Deceased Donor Transplant Rate by Blood Group - Per 100 Active Patient-Years

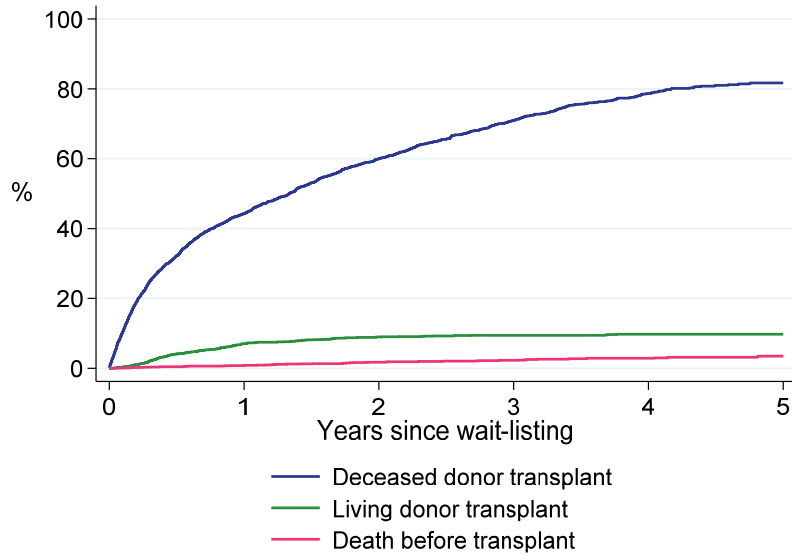


## Outcomes of Waitlisting

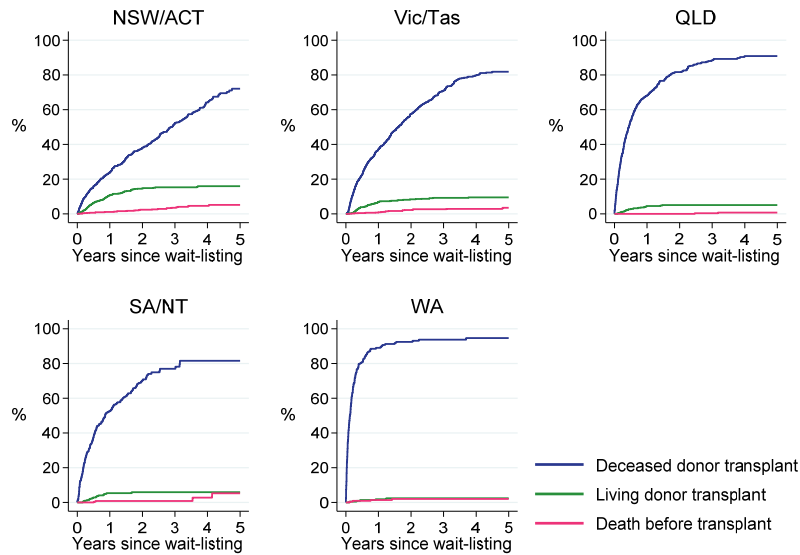
Figures 6.7-6.9 show the outcomes of patients who commenced dialysis during 2013-2018 and were subsequently wait-listed for a kidney transplant. These analyses show the cumulative incidence of deceased donor transplantation, living donor transplantation or death. Each outcome is considered a competing risk for the other outcomes, and only the first event is considered.

Overall, patients were much more likely to undergo deceased donor transplantation than to receive a living donor transplant or to die (figure 6.7). There were important differences between states, with longer times to deceased donor transplantation in NSW/ACT and Victoria compared with the other states, and correspondingly higher rates of living donor transplantation (especially in NSW/ACT) (figure 6.8). Note that these analyses only consider time from waitlisting; differences in time from dialysis start to wait-listing may reduce some of these discrepancies. Figure 6.9 shows the same data by blood group; patients who were blood group AB or A received transplants more quickly than blood group B or O patients.

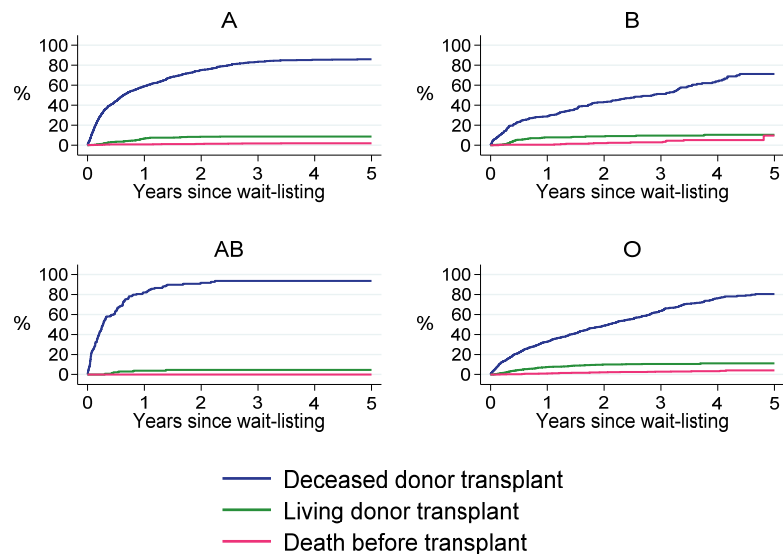
**Figure 6.7 - Outcomes after wait-listing - Australian incident dialysis patients 2013-2018**



**Figure 6.8 - Outcomes after wait-listing - Australian incident dialysis patients 2013-2018**



**Figure 6.9 - Outcomes after wait-listing - Australian incident dialysis patients 2013-2018**



## Survival after Waitlisting

Figure 6.10 shows the survival of patients who commenced dialysis in Australia over 2013-2018 and were subsequently wait-listed for a deceased donor kidney-only transplant. Survival is shown from the time of listing and is censored at transplantation (but not at removal from the list). Survival of this highly selected patient group was excellent with 1- and 3-year survival of 98.8% and 94.1% respectively. The mortality rate was correspondingly low at 1.9 deaths per 100 patient-years (95% CI 1.5-2.5).

**Figure 6.10 - Survival after wait-listing - Australian incident dialysis patients 2013-2018 Censored at transplantation**

