Australia and New Zealand Organ Donation Registry

2017
Annual Report
Data to 31-Dec-2016

SECTION 1

Summary of Deceased Donor Activity

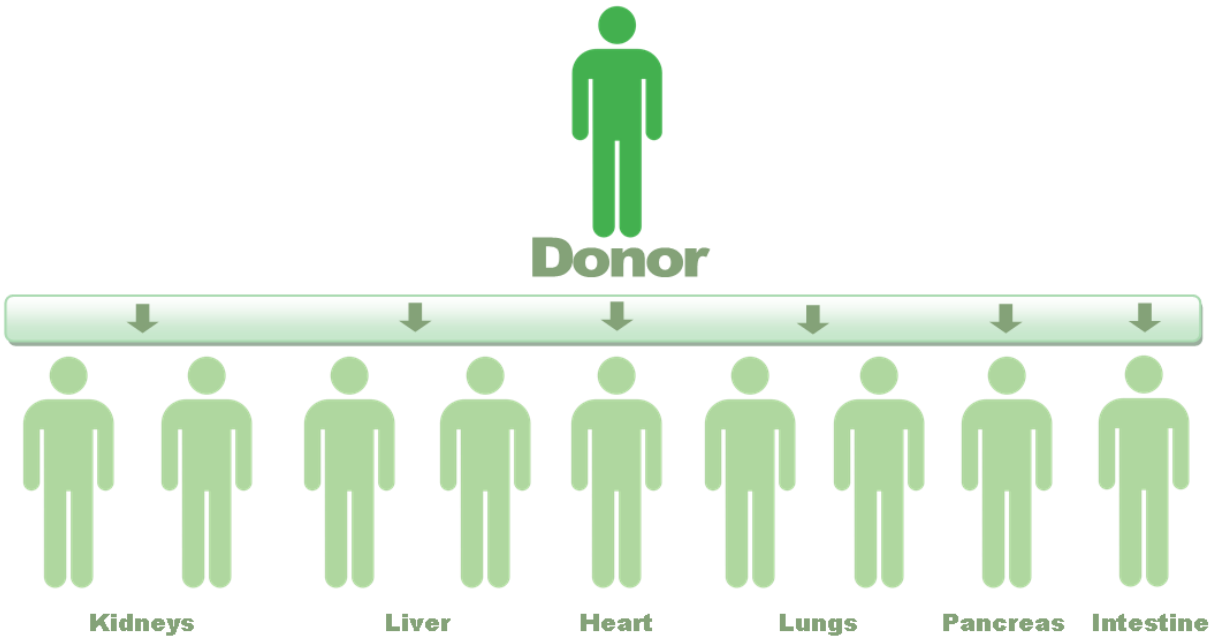
SUMMARY

This section summarises some key messages from the report on organ donation and activity in Australia and New Zealand, in 2016 compared to the previous year.

Since its inception in 1989 in Australia and 1993 in New Zealand, the Australian and New Zealand Organ Donation Registry (ANZOD) continues to record and report on organ donation within Australia and New Zealand.

Data related to organ donation and transplantation activity is essential in identifying opportunities for improving care of donors, informing on quality of transplant organs and transplant recipient outcomes.

One Donor can benefit the lives of a number of recipients suffering from end stage organ disease. One donor could donate up to 9 organs including, kidneys (left and right), Liver (split left and right), Heart, Lungs (left and right), Pancreas and Intestine, improving the lives of people wait listed for an organ transplant.



In 2016, both Australia and New Zealand reached their highest rates of donation. The following summarises the deceased donation activity of 2016, compared with the previous year 2015.

In Australia:

- 503 actual deceased organ donors in 2016, an increase of 15.6% in the number of donors from 2015 (435 donors);
- an increase in the deceased organ donors per million population (pmp) to 20.8 donors pmp in 2016 from 18.3 donors pmp in 2015;
- 19.0% increase in the number of donors after brain death to 375 and a 6.7% increase in the number of donors after circulatory death to 128 in 2016;
- 16.7% increase in the total number of patients whose lives were saved or improved by an organ transplant to 1447 recipients;
- 16.8% increase in the total number (821) of kidney transplants (34 pmp)
- 18.9% increase in the total number (314) of liver transplants (13 pmp)
- 30.5% increase in the total number (124) of heart transplants (5.1 pmp)
- 1.6% increase in the total number (196) of lung transplants (8.1 pmp)
- 15.6% increase in the total number (52) of pancreas transplants (2.2 pmp)

In New Zealand:

- 61 actual deceased donors in 2016, an increase of 15.1% in the number of donors from 2015 (53 donors)
- the deceased organ donors per million population (dpmp) figure increased to 13 dpmp in 2016 from 11.5 dpmp in 2015
- 10.4% increase in the total number of patients whose lives were saved or improved by an organ transplant to 170 recipients;
- 23.3% increase in the total number (90) of kidney transplants (19.2 pmp)
- 15.2% increase in the total number (53) of liver transplants (11.3 pmp)
- 8.3% fall in the total number (11) of heart transplants (2.3 pmp)
- 20.0% fall in the total number (20) of lung transplants (4.3 pmp)
- 33.3% increase in the total number (4) of pancreas transplants (0.9 pmp)

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 1: Summary of Organ Donation and Transplant Activity. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at www.anzdata.org.au

SECTION 2

Overview of Organ Donation Activity

SUMMARY

This section summarises organ donation in Australia and New Zealand. In 2016 both countries reached the highest rates of donation. Figures reported here include the number of donors per million population; and number of transplant recipients and organs transplanted during 2016 in comparison to previous years.

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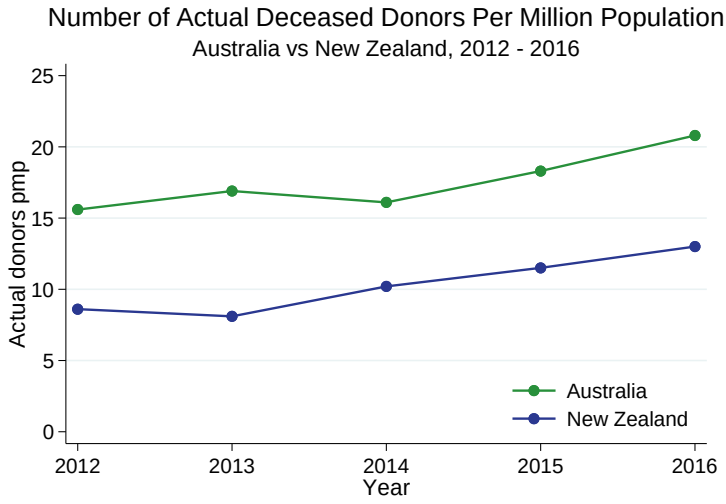
Table of Figures

Actual Deceased Organ Donors

Australian and New Zealand donor figures include all donors consented for organ and tissue donation who went to the operating theatre for the purpose of organ or tissue retrieval for transplantation. This is consistent with international reporting (World Health Organisation - Human Organ and Tissue Transplantation. http://www.who.int/ethics/topics/human_transplant/en/*).*

The deceased organ donors per million population (dpmp) figures in Australia increased to 20.8 dpmp in 2016 from 18.3 dpmp in 2015. In New Zealand, the rate rose to 13 dpmp in 2016, from 11.3 dpmp in 2015.

Figure 2. 1 Number of Actual Deceased Donors Per Million Population, Australia & New Zealand, 2012 – 2016



In Australia, there remains variation in organ donation rates between jurisdictions (Table 2.1). In 2016, rates varied from 17.7 dpmp in New South Wales to 32.3 dpmp in the Australian Capital Territory.

Table 2.1 Number of Actual Deceased Donors[1] by State[2]/Country 2012 – 2016					
n (Donors Per Million Population)	**2012**	**2013**	**2014**	**2015**	**2016**
Queensland	78 (17.1)	77 (16.6)	71 (15)	72 (15.1)	106 (21.9)
New South Wales[3]	88 (12.4)	102 (14.2)	92 (12.6)	127 (17.2)	133 (17.7)
Australian Capital Territory[3]	12 (20.2)	6 (10)	11 (18.2)	13 (21.2)	20 (32.3)
Victoria	92 (16.3)	110 (19.2)	117 (20)	126 (21.2)	140 (23.1)
Tasmania	15 (29.3)	8 (15.6)	9 (17.5)	9 (17.4)	11 (21.2)
South Australia	29 (17.5)	34 (20.4)	36 (21.4)	42 (24.7)	40 (23.4)
Northern Territory	8 (33.9)	7 (28.9)	7 (28.8)	4 (16.4)	6 (24.5)
Western Australia	32 (13.1)	47 (18.7)	35 (13.7)	42 (16.2)	47 (18)
Australia	**354 (15.6)**	**391 (16.9)**	**378 (16.1)**	**435 (18.3)**	**503 (20.8)**
New Zealand	**38 (8.6)**	**36 (8.1)**	**46 (10.2)**	**53 (11.5)**	**61 (13)**

[1] This figure relates to the number of donors for whom the retrieval operation commenced for the purpose of transplantation. It includes donors who may have been deemed medically unsuitable at the time of the surgery or after removal of organs.
[2] refers to retrieval State (i.e. Albury-NSW donors are retrieved by Victoria)
[3] NSW population excludes residents of the NSW Southern Area Health Service (included in ACT population).
Population Data - June 2016. Please refer to methodology section of annual report for detail.

The variation, since 1998, in the number of actual deceased donors by Australian state/territory is shown in Figure 2.2 and for New Zealand shown in Figure 2.3.

Figure 2. 2 Number of Actual Deceased Donors, Australian States and Territories, 1998 - 2016

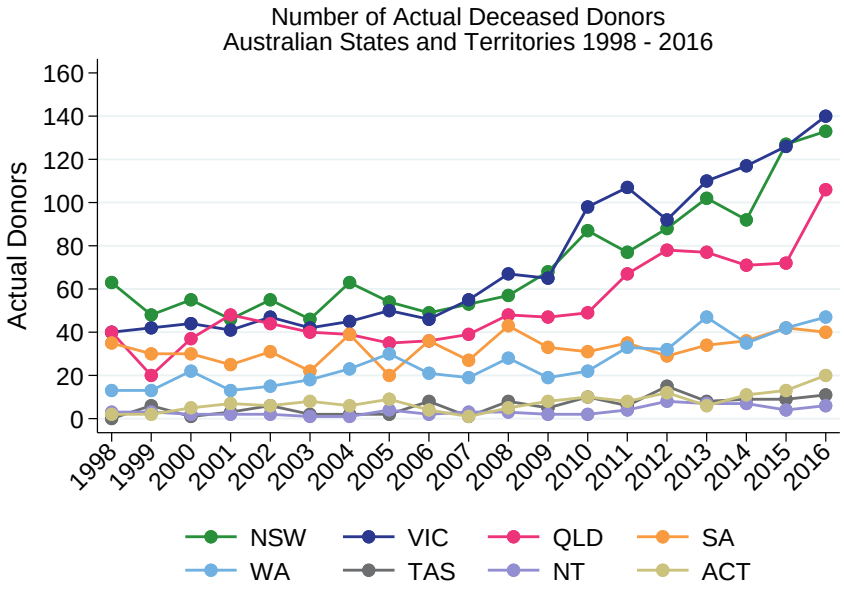
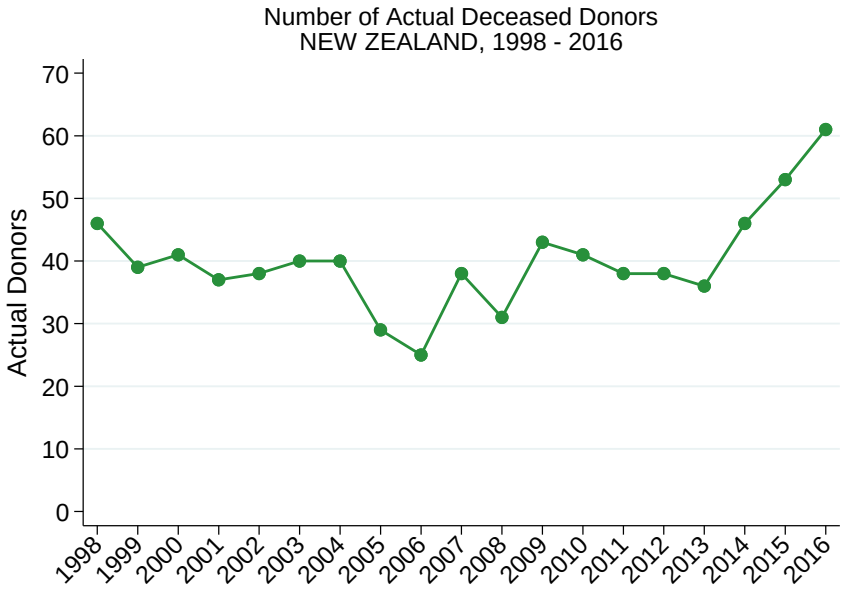
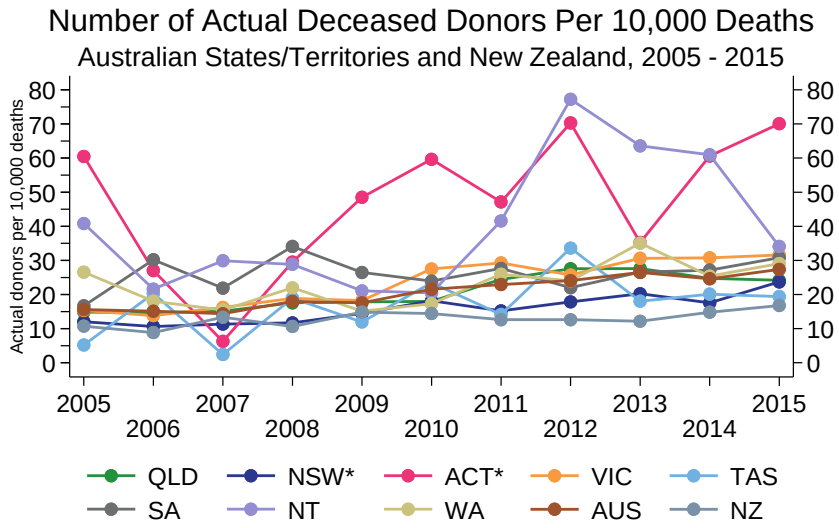


Figure 2. 3 Number of Actual Deceased Donors, New Zealand, 1998 - 2016



There has been a steady decline in overall death rates among most ages in Australia over recent years. In many respects, using the number of deaths as the denominator to illustrate organ donation outcomes may be a more meaningful comparator. Rates for various jurisdictions using this metric are shown in Figure 2.4 and Table 2.2.

Figure 2. 4 Number of Actual Deceased Donors Per 10,000 Deaths, 2005 - 2015



* NSW and ACT values are not adjusted for the NSW Southern Area Health Service, as death data were not available.
Australian data on deaths 2015 was the latest release at the time of this publication.
Australian Bureau of Statistics - Deaths 3302.0 and Statistics New Zealand

Table 2.2 Actual Deceased Donors per 10,000 Deaths Aged < 75 Years, 2012 - 2015
*( ) is the % Deaths < 75 years as a proportion of all deaths**

Year	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUS	NZ
2012	65 (38%)	46 (33%)	132 (36%)	91 (32%)	40 (35%)	89 (31%)	56 (75%)	68 (38%)	67 (34%)	34 (37%)
2013	74 (37%)	54 (33%)	207 (34%)	84 (31%)	98 (34%)	72 (30%)	101 (76%)	64 (37%)	71 (34%)	34 (37%)
2014	72 (38%)	61 (33%)	90 (39%)	98 (31%)	51 (36%)	84 (32%)	87 (73%)	93 (38%)	77 (34%)	33 (37%)
2015	67 (37%)	53 (33%)	170 (36%)	95 (32%)	56 (36%)	89 (31%)	82 (75%)	67 (38%)	72 (34%)	41 (36%)
2016	65 (37%)	72 (33%)	192 (37%)	102 (31%)	56 (35%)	99 (31%)	47 (72%)	77 (38%)	81 (34%)	46 (36%)

** The number of actual donors is compared to the number of deaths that are aged less than 75 years.*
Australian Bureau of Statistics - Deaths 3302.0 and Statistics New Zealand.
Australian data on deaths 2014 was the latest release at the time of this publication.

Organ Donation Activity

Figure 2.5 and 2.6 represents the number of actual deceased organ donors; transplant recipients and organ transplants as per million population over time for Australia and New Zealand respectively.

Figure 2. 5 Actual Deceased Organ Donors, Procedures, Recipients & Organs, PMP, Australia, 1998 - 2016

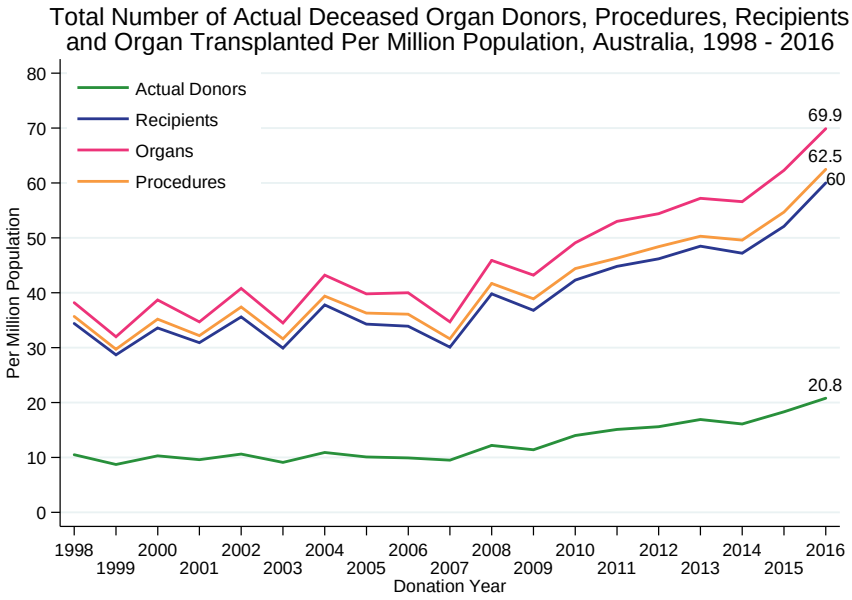
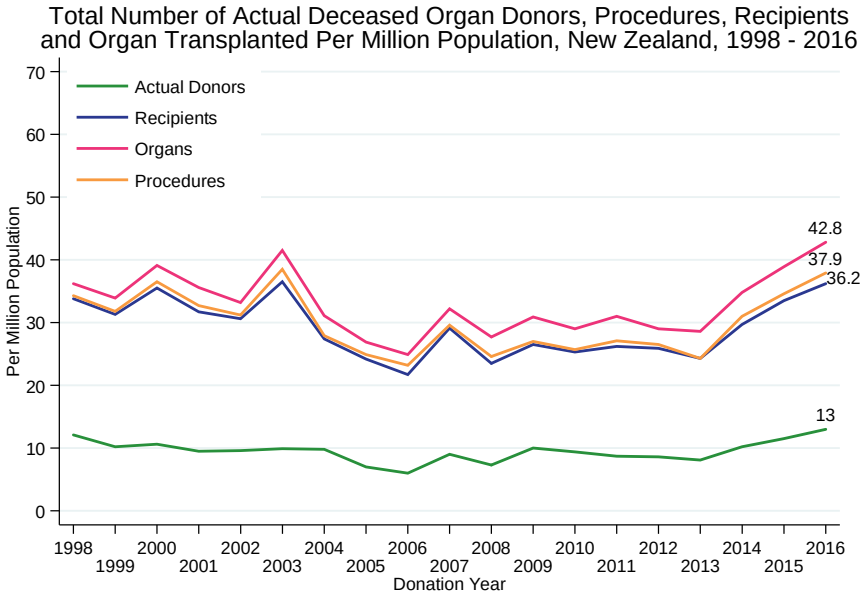


Figure 2. 6 Actual Deceased Donors, Procedures, Recipients & Organs, PMP, New Zealand, 1998 - 2016



Organ Donation Pathway

Much of the increase in donor numbers has arisen from changes in rates of donors after circulatory death (DCD), demonstrated in Figure 2.7 and Figure 2.8.

Figure 2. 7 Organ Donation Pathway, Australia, 1998 - 2016

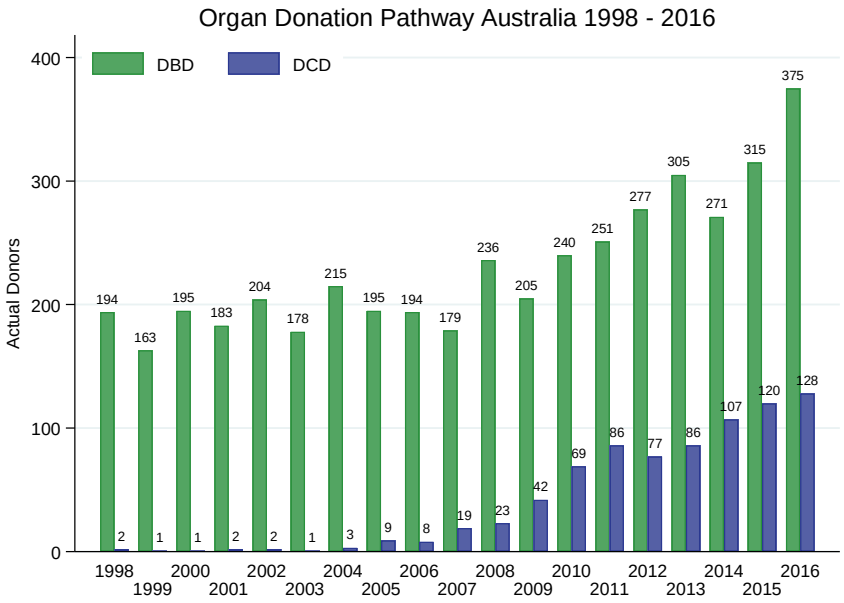
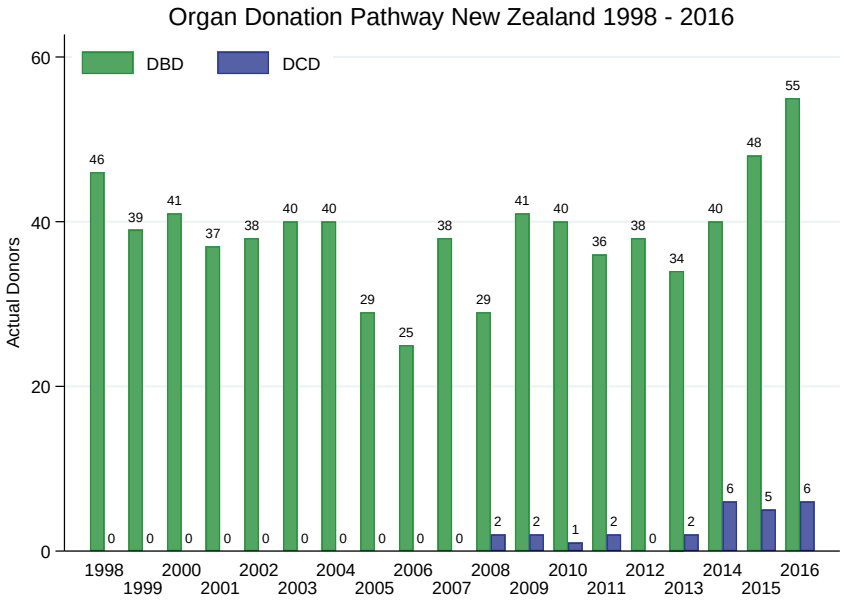


Figure 2. 8 Organ Donation Pathway, New Zealand, 1998 - 2016



Organ Donation Overview

Table 2.3 Australian Overview – 2016 (pmp) per million population	
Population (million)	24.1
Actual Deceased Organ Donors - both DBD & DCD included (pmp)	503 (20.8)
Kidney Transplant Recipients from deceased donors - includes all combinations (pmp)	821 (34)
Liver Transplant Recipients from deceased donors - includes all combinations (pmp)	314 (13)
Heart Transplant Recipients from deceased donors - includes all combinations (pmp)	124 (5.1)
Lung Transplant Recipients from deceased donors - includes all combinations (pmp)	196 (8.1)
Pancreas Transplant Recipients from deceased donors - includes all combinations (pmp)	52 (2.2)
Intestine Transplant Recipients from deceased donors - includes all combinations (pmp)	1 (0)
TOTAL number of Transplanted Recipients (pmp)[1]	**1447 (60)**
TOTAL number of Organs Transplanted (pmp)[2]	**1687 (69.9)**

Table 2.4 New Zealand Overview – 2016 (pmp) per million population	
Population (million)	4.7
Actual Deceased Organ Donors - both DBD & DCD included (pmp)	61 (13)
Kidney Transplant Recipients from deceased donors (pmp)	90 (19.2)
Liver Transplant Recipients from deceased donors (pmp)	53 (11.3)
Heart Transplant Recipients from deceased donors (pmp)	11 (2.3)
Lung Transplant Recipients from deceased donors (pmp)	20 (4.3)
Pancreas Transplant Recipients from deceased donors (pmp)	4 (.9)
TOTAL number of Transplanted Recipients (pmp)[1]	**170 (36.2)**
TOTAL number of Organ Transplant (pmp)[2]	**201 (42.8)**

[1] The total number of recipients includes all combinations of multi-organ transplants as a single count of transplantation
[2] The total number of transplanted organs differs from total number of transplant recipients as each organ, with the exception of double-kidney, is counted as a single organ transplant.

Organ Transplants

Table 2.5 Number of Organs Transplanted in 2016 By State & Country (pmp) in Australia and New Zealand										
Organs	**QLD**	**NSW**	**ACT**	**VIC**	**TAS**	**SA**	**NT**	**WA**	**AUS**	**NZ**
Kidney	179	208	34	249	14	67	12	78	841^ (34.9)	95^^ (20.2)
Liver	69	74	12	61	4	28	2	33	283+ (11.7)	51++ (10.9)
Heart	31	28	7	29	2	15	2	10	124 (5.1)	11 (2.3)
Lung	79	92	10	127	14	26	4	34	386* (16.0)	40** (8.5)
Pancreas	10	10	4	17	1	2	0	8	52 (2.2)	4 (0.9)
Intestine	0	0	0	1	0	0	0	0	1 (0.0)	0 (0.0)
Total	**368**	**412**	**67**	**484**	**35**	**138**	**20**	**163**	**1687 (69.9)**	**201 (42.8)**

The kidneys and lungs are counted as two separate organs (i.e. left and right kidney; left and right lung)
^ Includes 801 single kidneys, 11 double adult kidneys and nine en-bloc kidneys transplant procedures in Australia
^^ Includes 85 single kidneys, five double adult kidneys and zero en-bloc kidneys transplants in New Zealand
+ Includes 219 whole liver, 62 split liver and two cut down liver transplants in Australia
++ Includes 41 whole liver, four spilt liver and zero cut down liver in New Zealand
** Includes 190 Double lungs and 6 single lung transplants in Australia*
** *Includes 20 double lungs in New Zealand*

The number of organs transplanted per donor is calculated by the number of organs retrieved from actual donors for the purpose of transplantation and subsequently transplanted, divided by the number of actual donors. The number of organs transplanted per donor each year from 2004-2016 in Australia and New Zealand is shown in Figure 2.9. The mean number of transplant organs per deceased donor across Australia ranged from 3.1 in New South Wales to 3.5 across Queensland, Western Australia, Victoria and South Australia.

Figure 2. 9 Number of Organs Transplanted per Donor, 2004 – 2016

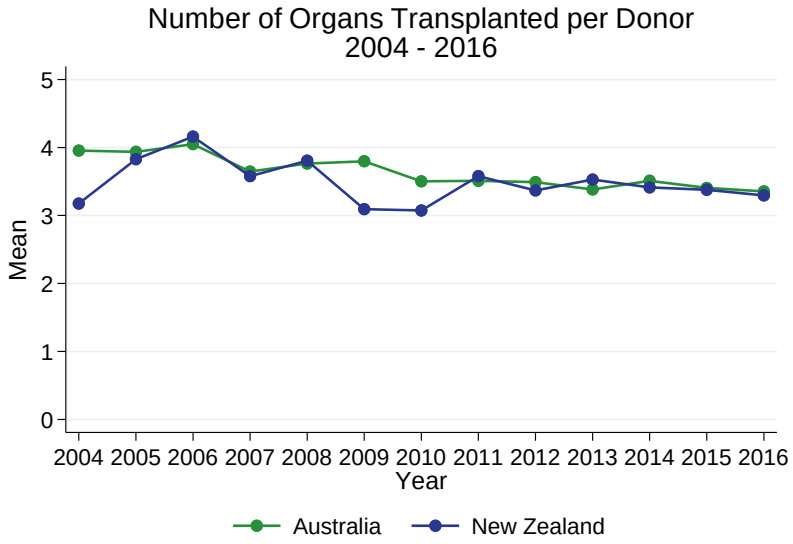


Figure 2.10 and Figure 2.11 shows the organ-specific transplant rates for Australia and New Zealand respectively over the period 1998 - 2016 (i.e. organ transplants per million population).

Figure 2. 10 Organs Transplanted, 1998 - 2016, Per Million Population, Australia

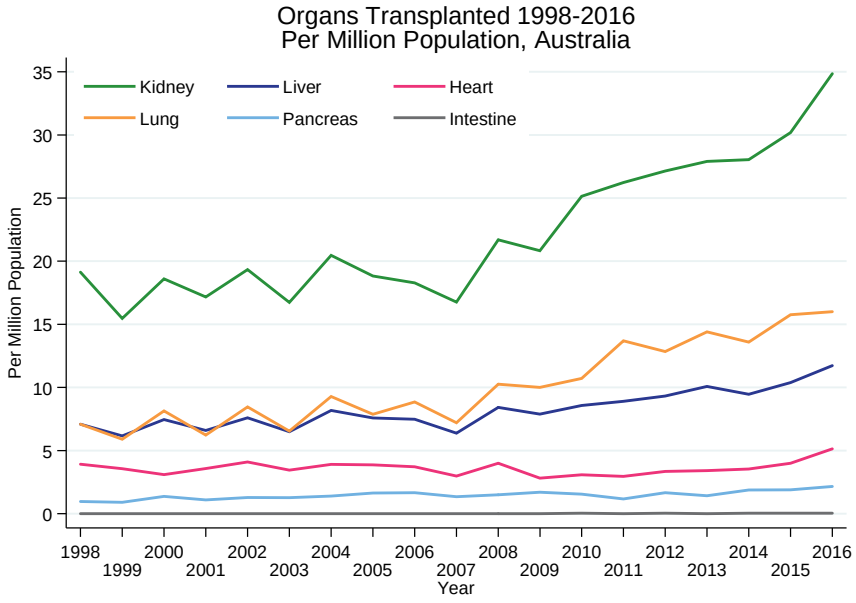


Figure 2. 11 Organs Transplanted, 1998 - 2016, Per Million Population, New Zealand

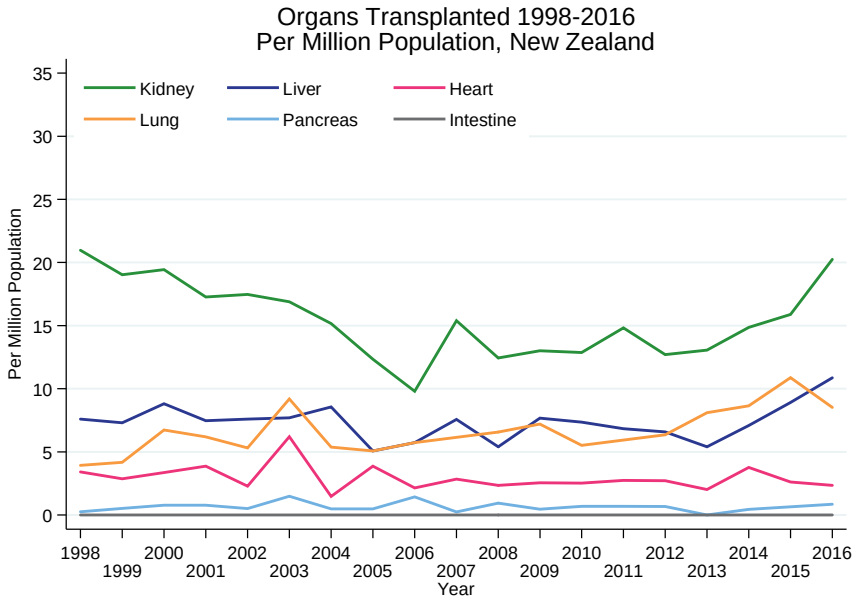


Figure 2.12 and 2.13 shows the corresponding rates for donation after circulatory death for Australia and New Zealand. Transplantation of organs from DCD has contributed to a significant increase in the rate of kidney transplantation.

Figure 2. 12 Organs Transplanted from DCD Donors, 1998 - 2016, Per million Population, Australia

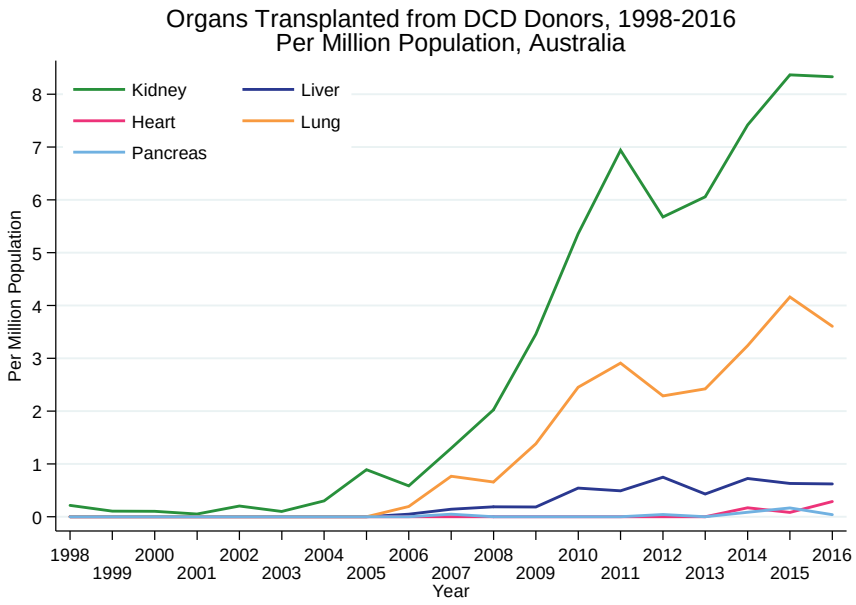
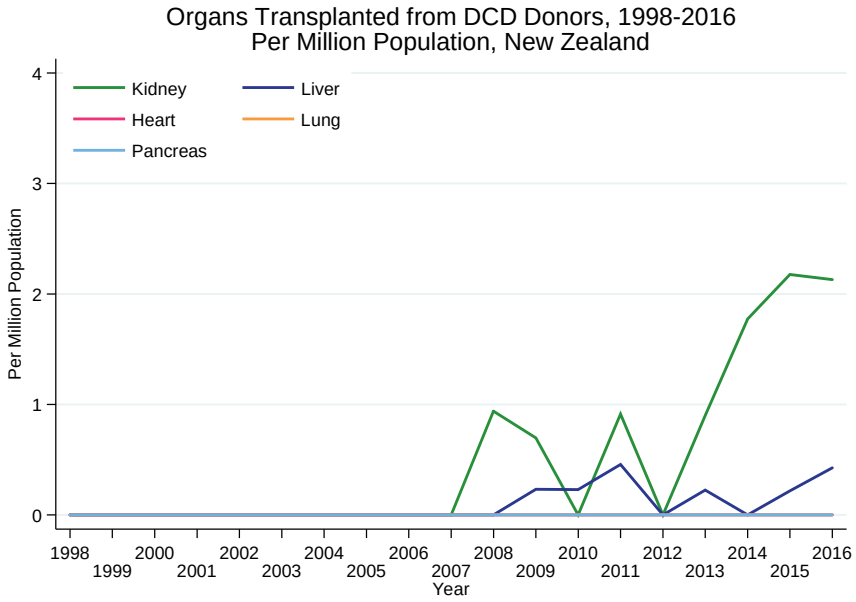


Figure 2. 13 Organs Transplanted from DCD Donors, 1998 -2016, Per Million Population, New Zealand



Deceased Organ Donation Location

The number of deceased donors reported are based on the State/Territory and country location in which the donor died. Supplement 1 shows a more detailed breakdown of the number of donors by retrieval hospital.

Table 2.6 details the number and proportion of donors in Australia by remoteness category. Overseas refers to donors who usually reside outside of Australia and New Zealand. The ABS standardised remoteness structure known as the Accessibility/Remoteness Index of Australia (ARIA) is used.

(http://www.abs.gov.au/websitedbs/D3310114.nsf/home/remoteness+structure#Anchor2b).

Table 2.6 Location of Postcodes of Deceased Donors 2012 - 2016

Postcode	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST
Major Cities of Australia	223 (55%)	403 (75%)	35 (56%)	393 (68%)	1 (2%)	124 (69%)	2 (6%)	142 (70%)	1323 (64%)
Inner Regional Australia	101 (25%)	101 (19%)	22 (35%)	151 (26%)	32 (62%)	19 (10%)	1 (3%)	30 (15%)	457 (22%)
Outer Regional Australia	64 (16%)	23 (4%)	4 (6%)	32 (5%)	17 (33%)	28 (15%)	21 (66%)	16 (8%)	205 (10%)
Remote Australia	1 (<1%)	3 (1%)	0 (0%)	0 (0%)	1 (2%)	6 (3%)	4 (13%)	7 (3%)	22 (1%)
Very Remote Australia	5 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (1%)	2 (6%)	3 (1%)	12 (1%)
Overseas	9 (2%)	8 (1%)	1 (2%)	6 (1%)	1 (2%)	2 (1%)	2 (6%)	4 (2%)	33 (2%)
Total	**403**	**538**	**62**	**582**	**52**	**181**	**32**	**202**	**2052**

In 2016, there were 33 deceased donors who were not permanent residents or citizens of either Australia were considered overseas visitors. There were no donors identified as overseas visitors reported in New Zealand in 2015.

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 2: Overview of Organ Donation Activity in Australia and New Zealand. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at www.anzdata.org.au

SECTION 3

Deceased Organ Donation Pathway

SUMMARY

This chapter reports on the organ donation pathway. It includes the known intention to be an organ donor; cause of death and events leading up to admission to hospital; the initial mention to donate; whether the donation did not proceed or proceeded down the donation after brain death or donation after circulatory death pathway, the maintenance and terminal treatment of the donor and the outcome of the retrieval procedure resulting in transplantation of donated organs.

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Donor Registration

The Registry collects the known intention to be an organ donor in the form of a decision recorded on a national register or on a state driver's license.

In Australia, the Australian Organ Donor Register[1] is the only national register for people to record their decision about becoming an organ and tissue donor for transplantation after death. This provides a record of a person's donation decision for families and clinicians in the event of their death and can only be verified by authorised medical personnel.

Only people aged 18 years and over can register their legally valid consent or objection on the Australian Organ Donor Register. People aged less than 18 years can become organ and tissue donors, although consent will need to be obtained from a family member at the time of death.

Table 3.1 Donors Enrolled in the Australian Organ Donor Registry 2016 (2015)

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST
Registered as Yes	25 (17)	54 (53)	5 (4)	30 (30)	2 (5)	28 (15)	3 (1)	23 (16)	170 (141)
Registered as No	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Not Registered	67 (50)	70 (65)	13 (9)	96 (87)	9 (4)	10 (23)	3 (3)	23 (26)	291 (267)
Not Accessed	14 (5)	9 (9)	2 (0)	14 (9)	0 (0)	2 (4)	0 (0)	1 (0)	42 (27)
Total	**106 (72)**	**133 (127)**	**20 (13)**	**140 (126)**	**11 (9)**	**40 (42)**	**6 (4)**	**47 (42)**	**503 (435)**

[1]The Australian Organ Donor Register (the Donor Register) is managed by the Department of Human Services on behalf of the Australian Government. The Donor Register is the only national register for people to record their decision about becoming an organ and tissue donor for transplantation after death. Registering is voluntary and people have complete choice over which organs and tissues they wish to donate. If a person does not want to become an organ and tissue donor, they can register their decision not to donate on the Donor Register which is available at http://www.medicareaustralia.gov.au/provider/patients/aodr/index.isp

Coroner's Cases

Table 3.4 shows the number of donor cases subject to Coronial inquiry. In Australia, 47% of donors in 2016 were subject to Coronial inquiry, compared to 49% in 2015. In New Zealand, it was 33% for 2016 and 47% in 2015.

Table 3.4 Coroner's Cases 2012 - 2016

	Australia					New Zealand				
	2012	**2013**	**2014**	**2015**	**2016**	**2012**	**2013**	**2014**	**2015**	**2016**
Yes	153	187	166	211	235	19	10	23	25	20
No	201	204	212	224	268	19	26	23	28	41
Total	354	391	378	435	503	38	36	46	53	61

Table 3.5 shows the number of Australian Coroner's cases by jurisdiction and the number of Coroner's cases in New Zealand for 2016 compared to 2015.

Table 3.5 Coroner's Cases by State and Country 2016 (2015)

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
Yes	51 (35)	47 (43)	10 (6)	73 (74)	4 (3)	22 (26)	2 (2)	26 (22)	235 (211)	20 (25)
No	55 (37)	86 (84)	10 (7)	67 (52)	7 (6)	18 (16)	4 (2)	21 (20)	268 (224)	41 (28)
Total	**106 (72)**	**133 (127)**	**20 (13)**	**140 (126)**	**11 (9)**	**40 (42)**	**6 (4)**	**47 (42)**	**503 (435)**	**61 (53)**

Cause of Death – All Donors

In Australia and New Zealand, road trauma continues to be a reducing cause of death while cerebrovascular accident (CVA) has been increasing in Australia since 1989, although in New Zealand figures have remained steady.

In Australia for the period 2012-2016, intracranial haemorrhage accounted for an overall 40% of donor deaths and traumatic brain injury for 16%.

Table 3.6 shows the cause of death by percentage in Australia and each Australian State and New Zealand over the last five years.

Table 3.6 Cause of Donor Death 2012 - 2016 (%)

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
Intracranial Haemorrhage	39%	41%	44%	37%	44%	42%	50%	40%	40%	47%
Traumatic Brain Injury	19%	17%	24%	14%	6%	18%	3%	16%	16%	19%
Cerebral Infarct	4%	6%	5%	8%	8%	6%	13%	8%	6%	6%
Cerebral Hypoxia / Ischaemia	28%	28%	24%	33%	23%	27%	22%	25%	29%	21%
Other Neurological Condition	0%	1%	0%	1%	4%	2%	0%	0%	1%	1%
Non-Neurological Condition	5%	4%	2%	3%	4%	2%	6%	4%	4%	3%

Table 3.7 shows the cause of death of donors by age group in 2016 in Australia and New Zealand. In donors aged 55 years and older, intracranial haemorrhage accounted for 38% of deaths in Australia and 32% in New Zealand in 2016.

In donors aged 15-34 years, cerebral hypoxia/ischaemia accounted for 13.5% of deaths in Australia and 4.9% in New Zealand in 2016.

Table 3.7 Cause of Donor Death Related to Age Group 2016

	Australia					New Zealand				
Cause of Death	**0-14**	**15-34**	**35-54**	**55+**	**n (%)**	**0-14**	**15-34**	**35-54**	**55+**	**n (%)**
Intracranial Haemorrhage	1	8	80	103	192 (38%)	0	2	8	20	30 (49%)
Traumatic Brain Injury	8	42	18	21	89 (18%)	0	5	2	1	8 (13%)
Cerebral Infarct	0	2	12	15	29 (6%)	0	2	3	1	6 (10%)
Cerebral Hypoxia / Ischaemia	16	68	68	26	178 (35%)	0	8	4	3	15 (25%)
Other Neurological Condition	0	2	6	0	8 (2%)	0	2	0	0	2 (3%)
Non-Neurological Condition	1	1	2	3	7 (1%)	0	0	0	0	0 (0%)
Total	**26**	**123**	**186**	**168**	**503**	**0**	**19**	**17**	**25**	**61**

The cause of death by age group is shown in Table 3.8 for each Australian State for 2016.

Table 3.8 Cause of Death Related to Age Group by Australian States, 2016

		0-14	15-34	35-54	55+	Total
QLD	**Intracranial Haemorrhage**	0	3	15	16	34
	Traumatic Brain Injury	2	15	6	3	26
	Cerebral Infarct	0	0	3	1	4
	Cerebral Hypoxia / Ischaemia	5	18	16	1	40
	Other	0	1	1	0	2
	Total	**7**	**37**	**41**	**21**	**106**
NSW	**Intracranial Haemorrhage**	1	1	24	28	54
	Traumatic Brain Injury	0	4	4	8	16
	Cerebral Infarct	0	0	5	6	11
	Cerebral Hypoxia / Ischaemia	6	10	17	14	47
	Other	0	1	3	1	5
	Total	**7**	**16**	**53**	**57**	**133**
ACT	**Intracranial Haemorrhage**	0	0	1	6	7
	Traumatic Brain Injury	0	4	0	2	6
	Cerebral Infarct	0	0	0	1	1
	Cerebral Hypoxia / Ischaemia	0	1	2	3	6
	Other	0	0	0	0	0
	Total	**0**	**5**	**3**	**12**	**20**
VIC	**Intracranial Haemorrhage**	0	1	17	28	46
	Traumatic Brain Injury	4	12	6	7	29
	Cerebral Infarct	0	0	2	5	7
	Cerebral Hypoxia / Ischaemia	5	24	16	6	51
	Other	1	1	3	2	7
	Total	**10**	**38**	**44**	**48**	**140**
TAS	**Intracranial Haemorrhage**	0	0	4	2	6
	Traumatic Brain Injury	0	0	0	0	0
	Cerebral Infarct	0	0	0	0	0
	Cerebral Hypoxia / Ischaemia	0	2	2	0	4
	Other	0	0	1	0	1
	Total	**0**	**2**	**7**	**2**	**11**
SA	**Intracranial Haemorrhage**	0	0	7	13	20
	Traumatic Brain Injury	1	4	1	1	7
	Cerebral Infarct	0	1	0	0	1
	Cerebral Hypoxia / Ischaemia	0	3	7	2	12
	Other	0	0	0	0	0
	Total	**1**	**8**	**15**	**16**	**40**
NT	**Intracranial Haemorrhage**	0	0	2	1	3
	Traumatic Brain Injury	0	0	0	0	0
	Cerebral Infarct	0	0	1	0	1
	Cerebral Hypoxia / Ischaemia	0	2	0	0	2
	Other	0	0	0	0	0
	Total	**0**	**2**	**3**	**1**	**6**
WA	**Intracranial Haemorrhage**	0	3	10	9	22
	Traumatic Brain Injury	1	3	1	0	5
	Cerebral Infarct	0	1	1	2	4
	Cerebral Hypoxia / Ischaemia	0	8	8	0	16
	Other	0	0	0	0	0
	Total	**1**	**15**	**20**	**11**	**47**

Cardiopulmonary Resuscitation

Cardiopulmonary resuscitation is recorded for events leading up to the admission and hospital stay for the patient prior to organ donation. Table 3.9 shows the number of recorded events for cardiopulmonary resuscitation for Australia and New Zealand donors.

Table 3.9 Cardiopulmonary Resuscitation, 2012 - 2016

	Australia					New Zealand				
	2012	**2013**	**2014**	**2015**	**2016**	**2012**	**2013**	**2014**	**2015**	**2016**
Yes	130	155	170	212	236	14	8	15	25	23
No	224	234	207	223	266	24	27	31	28	38
Unknown	0	2	1	0	1	0	1	0	0	0
Total	**354**	**391**	**378**	**435**	**503**	**38**	**36**	**46**	**53**	**61**

Table 3.10 Cardiopulmonary Resuscitation by Australian State, 2016 (2015)

	QLD	**NSW**	**ACT**	**VIC**	**TAS**	**SA**	**NT**	**WA**
Yes	56 (38)	52 (60)	9 (7)	73 (60)	5 (5)	18 (20)	2 (3)	21 (19)
No	50 (34)	81 (67)	11 (6)	66 (66)	6 (4)	22 (22)	4 (1)	26 (23)
Unknown	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	**106 (72)**	**133 (127)**	**20 (13)**	**140 (126)**	**11 (9)**	**40 (42)**	**6 (4)**	**47 (42)**

Initial Mention of Organ Donation

In 2016, organ donation was predominantly raised by Intensive Care Clinicians and Registrars; 53% of cases in Australia and 82% in New Zealand, as shown in Table 3.11.

In Australia, organ donation was raised by a Donor Specialist on 51 (10%) occasions which is a 4% increase from 2015 (Table 3.11). Organ donation in New Zealand was initially mentioned by a Donor Coordinator in one case. In 2016, 34% of families raised the subject of organ donation in Australia, up 3%, compared to 32% in 2015. In New Zealand, 8% of families raised donation in 2016 (15% in 2015). (Table 3.11)

See Table 3.12 for individual State and Territory statistics.

Table 3.11 Initial Mention of Organ Donation 2012 - 2016

	Australia					New Zealand				
	2012	**2013**	**2014**	**2015**	**2016**	**2012**	**2013**	**2014**	**2015**	**2016**
Donor Specialist	1	21	45	29	51	0	1	2	0	1
ICU Consultant	214	242	186	228	246	33	28	35	37	48
ICU Trainee (E.g. Registrar)	15	13	24	25	21	1	0	2	3	2
Social Worker	0	0	1	0	0	0	0	0	0	0
Other	3	5	0	2	8	2	2	1	3	2
Family	110	100	112	142	169	2	5	5	8	5
Nursing Staff	4	2	1	1	1	0	0	1	2	3
Emergency Clinician	7	8	9	8	7	0	0	0	0	0
TOTAL	**354**	**391**	**378**	**435**	**503**	**38**	**36**	**46**	**53**	**61**

Table 3.12 Initial Mention of Organ Donation by Australian State 2016 (2015)

	QLD	**NSW**	**ACT**	**VIC**	**TAS**	**SA**	**NT**	**WA**
Donor Specialist	7 (1)	24 (18)	1 (0)	11 (7)	6 (2)	0 (1)	2 (0)	0 (0)
ICU Consultant	54 (51)	65 (70)	7 (9)	65 (54)	2 (4)	31 (25)	1 (1)	21 (14)
ICU Trainee (E.g. Registrar)	2 (0)	2 (6)	2 (0)	12 (10)	1 (0)	1 (4)	0 (0)	1 (5)
Social Worker	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Other	0 (0)	3 (1)	1 (1)	3 (0)	0 (0)	0 (0)	0 (0)	1 (0)
Family	43 (20)	36 (29)	8 (3)	47 (54)	1 (2)	8 (12)	3 (3)	23 (19)
Nursing Staff	0 (0)	0 (0)	0 (0)	0 (1)	1 (0)	0 (0)	0 (0)	0 (0)
Emergency Clinician	0 (0)	3 (3)	1 (0)	2 (0)	0 (1)	0 (0)	0 (0)	1 (4)
TOTAL	**106 (72)**	**133 (127)**	**20 (13)**	**140 (126)**	**11 (9)**	**40 (42)**	**6 (4)**	**47 (42)**

Donation Not Proceeding

An intended donor is a person for whom authority has been given, but organ donation did not proceed. A donation may not proceed due to positive virology tests, cardiac arrest or further investigations discovered a cancer of infection. In 2016, the main reason donors did not proceed to organ donation was due to disease of organ.

Table 3.13 represents the number of non-proceeding DBD and DCD donors for each State/Territory and overall for Australia and New Zealand compared to the number of actual donors who did proceed to theatre for organ donation. In Australia, there were 143 donors who did not proceed down the pathway of solid organ donation, of which 38 (27%) were DBD and 101 (71%) were DCD and in New Zealand there were no DBD and only one DCD intended donors.

Table 3.13 Actual vs Intended (Non-Proceeding) Donors 2016

	DBD		DCD		Total	
	Actual	**Intended**	**Actual**	**Intended**	**Actual**	**Intended**
QLD	89 (95%)	5 (5%)	17 (55%)	14 (45%)	106 (84%)	20 (16%)
NSW	97 (92%)	9 (8%)	36 (64%)	20 (36%)	133 (81%)	31 (19%)
ACT	15 (94%)	1 (6%)	5 (83%)	1 (17%)	20 (91%)	2 (9%)
VIC	84 (89%)	10 (11%)	56 (55%)	46 (45%)	140 (71%)	56 (29%)
TAS	10 (83%)	2 (17%)	1 (50%)	1 (50%)	11 (73%)	4 (27%)
SA	34 (85%)	6 (15%)	6 (38%)	10 (63%)	40 (71%)	16 (29%)
NT	4 (80%)	1 (20%)	2 (67%)	1 (33%)	6 (75%)	2 (25%)
WA	42 (91%)	4 (9%)	5 (38%)	8 (62%)	47 (80%)	12 (20%)
AUSTRALIA	**375 (91%)**	**38 (9%)**	**128 (56%)**	**101 (44%)**	**503 (78%)**	**143 (22%)**
NEW ZEALAND	**55 (100%)**	**-**	**6 (86%)**	**1 (14%)**	**61 (98%)**	**1 (2%)**

The reasons for donations not proceeding are described in Table 3.14

Table 3.14 Reasons Why Donation Did Not Proceed 2016, Australia

Planned donation after circulatory death but died outside of time limit	51
Medical contraindication discovered during consideration for donation	49
No suitable Recipients available	21
Declined by family after initially giving consent	7
Unexpected cardiac arrest	3
Didn't progress to brain death	2
Refusal by Coroner / Pathologist	2
Climbing urea and electrolytes and inotropic support	1
Clinical condition improved	1
Failed physiological support	1
High risk	1
Logistics - timeframe to transplantation	1
Logistics - No available retrieval team	1
Organs declined as not medically suitable	1
Stood down (timeframes changed)	1
TOTAL	**143**

Donation After Circulatory Death

The majority of organs are donated by the Donation after Brain Death (DBD) pathway. After certification of brain death, the donor remains on the ventilator and the removal of organs may occur many hours later. The Donation after Circulatory Death (DCD) pathway is defined by patients with irreversible cessation of circulation. As soon as cessation of circulation is confirmed, the retrieval procedure is commenced in order to minimise warm ischaemic time.

The number of DCD donors since 1989 has risen to 804 donors for Australia and 28 DCD donors for New Zealand.

In Australia, in 2016, there were 128 DCD donors and in New Zealand there were six DCD donors.

Table 3.15 shows the number of DCD Donors by jurisdiction.

Table 3.15 Donation after circulatory Death, 2012-2016

Year	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
2012	16	19	2	30	0	4	1	5	**77**	**0**
2013	24	15	0	35	3	2	2	5	**86**	**2**
2014	20	27	3	47	0	4	2	4	**107**	**6**
2015	19	40	4	47	0	5	0	5	**120**	**5**
2016	17	36	5	56	1	6	2	5	**128**	**6**

The first multi-organ DCD was performed in South Australia in 2006.

In 2016, the mean age for a DCD donor was 46.2 years and the age range was 0.3 to 54.2 years in Australia.

In New Zealand, the mean age of DCD was 42.9 years and the age range was 17.1 years to 57.9 years.

Causes of death leading to DCD in Australia, in 2016 were intracranial haemorrhage (31), cerebral hypoxia/ischaemia (50), traumatic brain injury (20), cerebral infarct (15), other neurological conditions (5) and non-neurological conditions (7).

Causes of death leading to DCD in New Zealand in 2016 were intracranial haemorrhage (1), cerebral hypoxia/ischaemia (3) and cerebral infarct (2).

Time from Admission to Brain Death

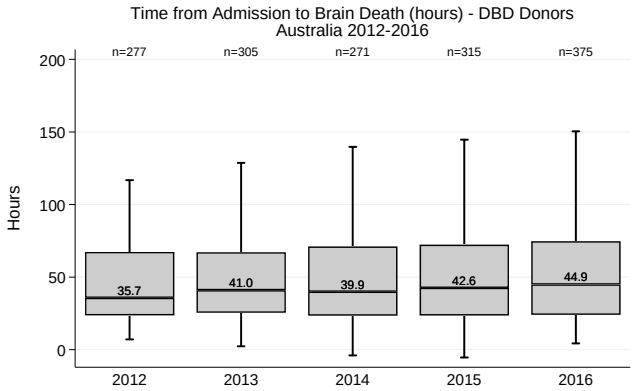
Australia

In 2016, 24% of Australian donors were declared brain dead within 24 hours of hospital admission.

66 percent of donors were declared brain dead between 1 – 5 days of hospital admission.

10 percent of donors (36) were in hospital for more than 5 days before being declared brain dead.

Figure 3. 1 Time from Admission to Brain Death, AUS



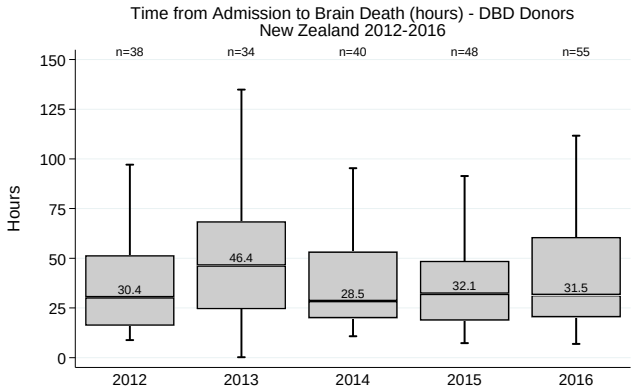
New Zealand

In 2016, 35% of New Zealand DBD donors were declared brain dead within 24 hours of hospital admission.

56 percent of DBD donors were declared brain dead between 1 – 5 days of hospital admission.

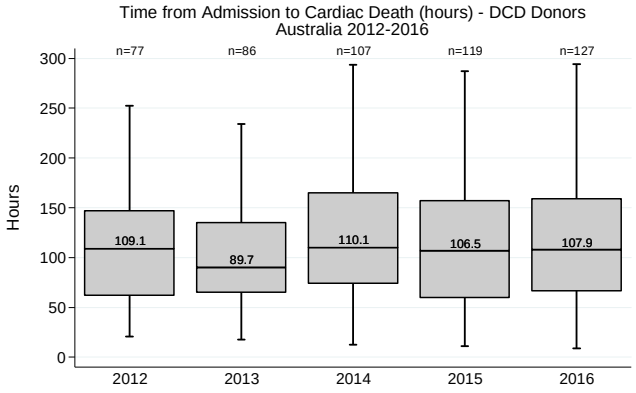
9 percent of DBD donors (5) were in hospital for more than 5 days before being declared brain dead.

Figure 3. 2 Time from Admission to Brain Death, NZ



Time from Admission to Circulatory Death

Figure 3. 3 Time from Admission to Cardiac Death, AUS



Australia

As shown in Figure 3.3, in 2016, 2% of Australian DCD donors died within 24 hours of hospital admission.

52% of DCD donors died between 1-5 days of hospital admission.

45 percent of DCD donors (57) were in hospital for more than five days prior to death.)

Time of admission to hospital was unknown for only one DCD donor.

New Zealand

In New Zealand, 83% of DCD donors died between 1-5 days of hospital admission.

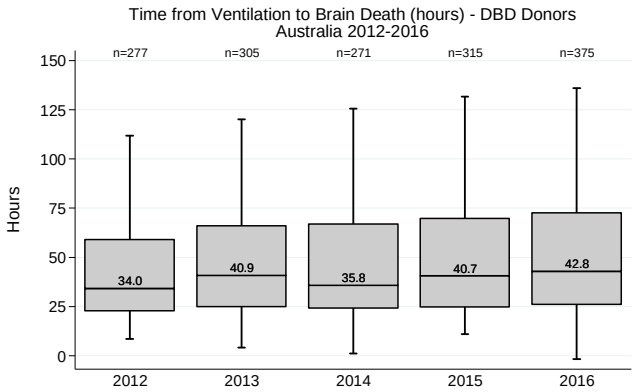
17 percent of DCD donors (1) were in hospital for more than five days prior to death.)

Time from Ventilation to Brain Death

Australia

In 2016, the median time from ventilation to brain death was 42.8 hours.

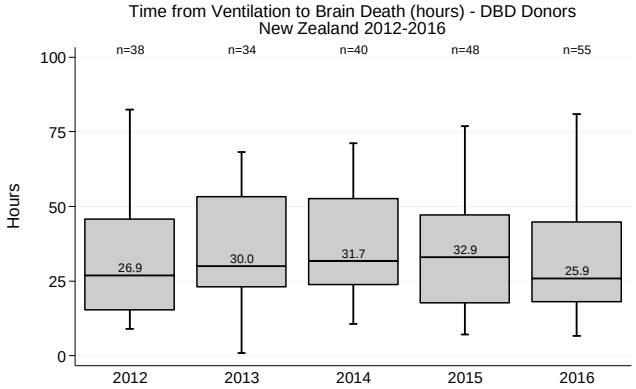
Figure 3. 4 Time from Ventilation to Brain Death, AUS



New Zealand

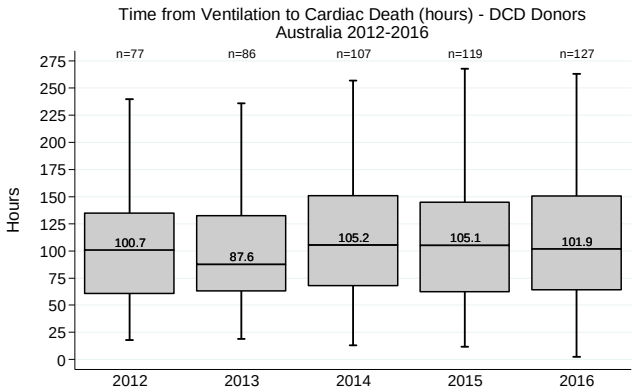
In 2016, the median time from ventilation to brain death was 25.9 hours

Figure 3. 5 Time from Ventilation to Brain Death, NZ



Time from Ventilation to Circulatory Death

Figure 3. 6 Time from Ventilation to Cardiac Death, AUS



Australia

Figure 3.6 shows that in 2016, the median time from ventilation to circulatory death was 101.9 hours.

New Zealand

The median time in New Zealand in 2016 from ventilation to circulatory death was 105.6 hours.

Time from Brain Death to Donation

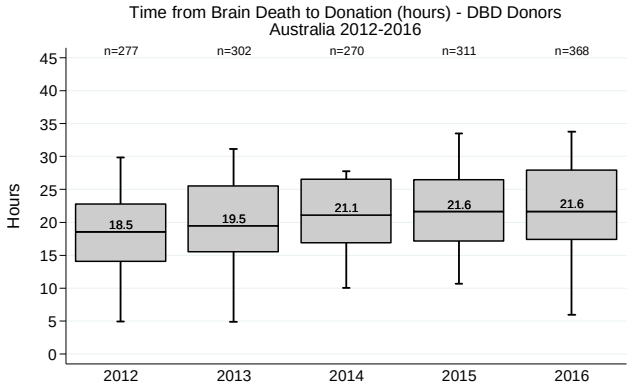
Australia

In 2016, 35 DBD donors (9%) underwent aortic cross clamp within twelve hours of the certification of brain death.

The median time was 21.6 hours.

Cross clamp did not proceed in 7 Australian donors.

Figure 3. 7 Time from Brain Death to Donation, AUS



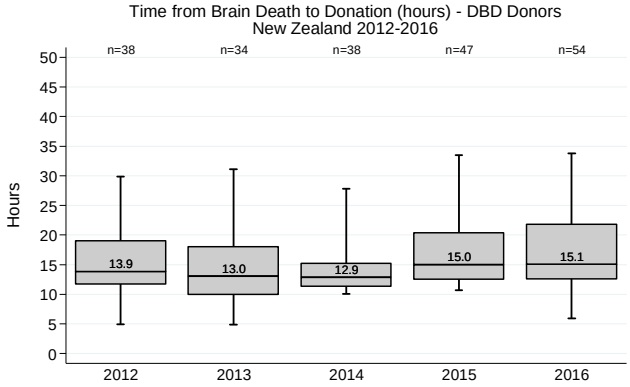
New Zealand

In 2016, 17 DBD (31%) underwent aortic cross clamp within twelve hours of the certification of brain death.

The median time was 15.1 hours.

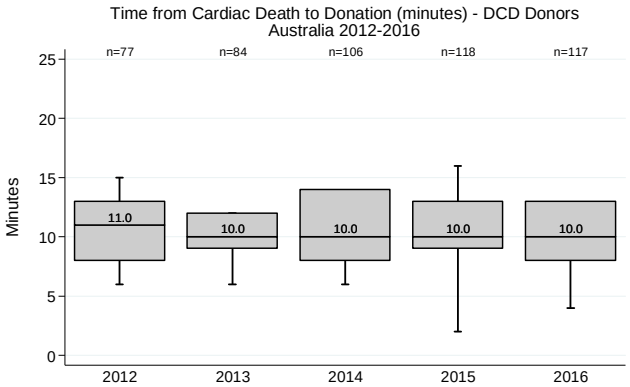
Cross clamp did not proceed in 1 New Zealand donor.

Figure 3. 8 Time from Brain Death to Donation, AUS



Time from Circulatory Death to Donation

Figure 3. 9 Time from Cardiac Death to Donation, AUS



Australia

In 2016, 63 DCD donors (49%) underwent aortic cross clamp within 12 minutes of the certification of brain death. The median time was 10 minutes.

New Zealand

In 2016, 5 DCD (83%) underwent aortic cross clamp within 12 minutes of the certification of brain death. The median time was 9 minutes.

For DCD donors, the time from circulatory death to time of cold perfusion and for DBD donors, the time from brain death to time of cross clamp is used for the analysis.

Summary – Organs Requested, Consent Given, Retrieved and Transplanted

Table 3.16 shows the outcome of organs requested in 2016 (2015). The information on request for organ donation, refers only to those patients who become actual donors. The reasons for organs not requested, not retrieved or not transplanted are documented for all of the specific organs in Chapter 5 – Organ Data.

The reason organs were not used are identified in Chapter 5 - Organ Data and in Supplement 1 for Australia and Supplement 2 for New Zealand. Organs retrieved and used for research were not intended for transplantation in the first instance

Table 3.16 Summary for Organ Donation Pathway by Organ Type 2016 (2015)

		Kidneys*	Liver	Heart	Lungs*	Pancreas	Intestines
Australia	**Organs for donation**	1006 (870)	503 (435)	503 (435)	1006 (870)	503 (435)	503 (435)
	Organs Requested	981 (828)	464 (389)	393 (306)	912 (784)	406 (328)	246 (185)
	Organs Consented	977 (824)	456 (377)	370 (281)	886 (752)	394 (314)	213 (147)
	Organs Retrieved	883 (763)	298 (264)	125 (103)	410 (394)	120 (121)	1 (1)
	Utilised organs for transplantation	841 (718)	283 (247)	124 (95)	386 (375)	52 (45)	1 (1)
	Recipients transplanted^	821 (703)	314 (264)	124 (95)	196 (193)	52 (45)	1 (1)
New Zealand	**Organs for donation**	122 (106)	61 (53)	61 (53)	122 (106)	61 (53)	61 (53)
	Organs Requested	120 (100)	60 (50)	50 (40)	110 (92)	45 (39)	0 (0)
	Organs Consented	120 (100)	60 (50)	50 (39)	110 (92)	45 (38)	0 (0)
	Organs Retrieved	99 (78)	51 (41)	11 (12)	40 (50)	4 (3)	0 (0)
	Utilised organs for transplantation	95 (73)	51 (41)	11 (12)	40 (50)	4 (3)	0 (0)
	Recipients transplanted^^	90 (73)	53 (46)	11 (12)	20 (25)	4 (3)	0 (0)

**Kidneys and Lungs are counted as two separate organs (i.e. left and right)*

^For Australia 2016(2015), includes 20(15) Double adult/Enbloc Kidneys, 64(35) Partial Livers, 6(11) Single Lung and 190(182) Double Lung Transplants.

^^For New Zealand 2016(2015), includes 5(0) Double-adult/Enbloc Kidneys, 4(10) Partial Livers, 0(0) Single Lung Transplants and 20(25) Double Lung Transplants.

Multiple Organ Retrieval

For Australia, there were 503 actual deceased organ donors in 2016. Of those donors, 489 donors had at least one organ retrieved; and 480 resulted in at least one organ transplanted. There were 123 (24%) Australian donors in 2016 who had a single organ retrieved and transplanted. Kidney only donation occurred in 88 cases, 21 donating a liver, one donating a heart and 13 donating lungs. In 2016, 366 (73%) donors had two or more organs retrieved for the purpose of transplantation. (Table 3.17)

Similarly, for New Zealand, there were 61 actual deceased organ donors in 2016. Of those donors, 59 had at least one organ retrieved; and all 59 resulted in at least one organ transplanted. There were 13 (21%) single organ donors in 2016, six donating kidneys, six donating a liver and one donating lungs. In 2016, 46 (75%) of donors had two or more organs retrieved for the purpose of transplantation. (Table 3.17)

Table 3.17 Multiple Organs Retrieved per Donor 2012 - 2016

Organs Retrieved ^	Australia					New Zealand				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
No Organs	12 (3%)	16 (4%)	8 (2%)	8 (2%)	14 (3%)	4 (11%)	0 (0%)	3 (7%)	3 (6%)	2 (3%)
One	87 (25%)	86 (22%)	86 (23%)	118 (27%)	123 (24%)	5 (13%)	9 (25%)	12 (26%)	11 (21%)	13 (21%)
Two	107 (30%)	120 (31%)	107 (28%)	114 (26%)	166 (33%)	12 (32%)	13 (36%)	8 (17%)	14 (26%)	25 (41%)
Three	76 (21%)	100 (26%)	91 (24%)	95 (22%)	99 (20%)	8 (21%)	8 (22%)	12 (26%)	19 (36%)	13 (21%)
Four	50 (14%)	50 (13%)	51 (13%)	62 (14%)	62 (12%)	9 (24%)	6 (17%)	10 (22%)	5 (9%)	6 (10%)
Five	22 (6%)	19 (5%)	35 (9%)	37 (9%)	39 (8%)	0 (0%)	0 (0%)	1 (2%)	1 (2%)	2 (3%)
SIx	0 (0%)	0 (0%)	0 (0%)	1 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Table 3.18 Comparison of Multiple Organs Retrieved per Donor by State and Country 2016

Organs Retrieved ^	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
No Organs	3 (3%)	4 (3%)	2 (10%)	2 (1%)	1 (9%)	1 (3%)	0 (0%)	1 (2%)	14 (3%)	2 (3%)
1	20 (19%)	45 (34%)	5 (25%)	35 (25%)	2 (18%)	7 (18%)	2 (33%)	7 (15%)	123 (24%)	13 (21%)
2	40 (38%)	38 (29%)	5 (25%)	48 (34%)	5 (45%)	7 (18%)	2 (33%)	21 (45%)	166 (33%)	25 (41%)
3	25 (24%)	25 (19%)	4 (20%)	21 (15%)	2 (18%)	9 (23%)	2 (33%)	11 (23%)	99 (20%)	13 (21%)
4	12 (11%)	14 (11%)	1 (5%)	19 (14%)	1 (9%)	10 (25%)	0 (0%)	5 (11%)	62 (12%)	6 (10%)
5	6 (6%)	7 (5%)	3 (15%)	15 (11%)	0 (0%)	6 (15%)	0 (0%)	2 (4%)	39 (8%)	2 (3%)
6	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

^ *The organ types retrieved from a donor are: Kidney, Liver, Lung, Heart, Pancreas and Intestine.*

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SECTION 4

Deceased Organ Donor Profile

SUMMARY

This section provides a detailed description of organ donor demographic characteristics, including gender, age, ethnicity and religions. Data also describes pre-existing medical condition and virology screening assessed prior to deceased organ donation.

Contents

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Table of Figures

Donor Demography

Tables 4.1 and 4.2 contain a detailed description of organ donors in Australia and New Zealand respectively, in 2016 compared to 2015. These data show that there continues to be more male donors than female donors, the most common donor ethnicity is Australian, and there is a preponderance of blood groups O and A.

Table 4.1

Demography of Deceased Donors in Australia 2015 - 2016

		2015			2016		
		DBD	DCD	Total	DBD	DCD	Total
Gender	Male	185(59%)	74(62%)	259 (60%)	198(53%)	79(62%)	277 (55%)
	Female	130(41%)	46(38%)	176 (40%)	177(47%)	49(38%)	226 (45%)
Age	0-4	5(2%)	1(1%)	6 (1%)	7(2%)	3(2%)	10 (2%)
	5-14	10(3%)	3(3%)	13 (3%)	12(3%)	4(3%)	16 (3%)
	15-24	23(7%)	10(8%)	33 (8%)	51(14%)	9(7%)	60 (12%)
	25-34	42(13%)	9(8%)	51 (12%)	46(12%)	17(13%)	63 (13%)
	35-44	48(15%)	11(9%)	59 (14%)	60(16%)	15(12%)	75 (15%)
	45-54	65(21%)	21(18%)	86 (20%)	73(19%)	38(30%)	111 (22%)
	55-64	63(20%)	43(36%)	106 (24%)	70(19%)	24(19%)	94 (19%)
	65-74	47(15%)	21(18%)	68 (16%)	41(11%)	18(14%)	59 (12%)
	75+	12(4%)	1(1%)	13 (3%)	15(4%)		15 (3%)
BMI (kg/m2)	Underweight (<18.5)	12(4%)	5(4%)	17 (4%)	24(6%)	6(5%)	30 (6%)
	Normal (18.5-<25)	117(37%)	42(35%)	159 (37%)	143(38%)	42(33%)	185 (37%)
	Overweight (25-<30)	101(32%)	37(31%)	138 (32%)	127(34%)	52(41%)	179 (36%)
	Obese (>=30)	85(27%)	35(29%)	120 (28%)	81(22%)	28(22%)	109 (22%)
	Unknown	-	1(1%)	1 (0%)	-	-	-
Blood Group	A	126(40%)	48(40%)	174 (40%)	143(38%)	55(43%)	198 (39%)
	AB	10(3%)	5(4%)	15 (3%)	6(2%)	3(2%)	9 (2%)
	B	43(14%)	15(13%)	58 (13%)	36(10%)	13(10%)	49 (10%)
	O	136(43%)	52(43%)	188 (43%)	190(51%)	57(45%)	247 (49%)
Ethnicity							
Australian		237(75%)	89(74%)	326 (75%)	285(76%)	100(78%)	385 (77%)
Aboriginal/Torres Strait Islander		10(3%)	1(1%)	11 (3%)	15(4%)	5(4%)	20 (4%)
New Zealand European		4(1%)	1(1%)	5 (1%)	2(1%)	2(2%)	4 (1%)
New Zealand Māori		-	1(1%)	1 (0%)	5(1%)	-	5 (1%)
Pacific Islander		4(1%)	-	4 (1%)	2(1%)	1(1%)	3 (1%)
European		29(9%)	15(13%)	44 (10%)	32(9%)	11(9%)	43 (9%)
North African and Middle Eastern		2(1%)	2(2%)	4 (1%)	2(1%)	-	2 (0%)
Asian		23(7%)	9(8%)	32 (7%)	27(7%)	7(5%)	34 (7%)
American		4(1%)	1(1%)	5 (1%)	3(1%)	1(1%)	4 (1%)
Sub-Saharan African		2(1%)	1(1%)	3 (1%)	2(1%)	1(1%)	3 (1%)

Table 4.2

Demography of Deceased Donors in New Zealand 2015 - 2016							
		2015			2016		
		DBD	DCD	Total	DBD	DCD	Total
Gender	Male	29(60%)	4(80%)	33 (62%)	31(56%)	4(67%)	35 (57%)
	Female	19(40%)	1(20%)	20 (38%)	24(44%)	2(33%)	26 (43%)
Age	0-4	1(2%)	-	1 (2%)	-	-	-
	5-14	8(17%)	1(20%)	9 (17%)	8(15%)	-	8 (13%)
	15-24	7(15%)	-	7 (13%)	10(18%)	1(17%)	11 (18%)
	25-34	8(17%)	1(20%)	9 (17%)	3(5%)	1(17%)	4 (7%)
	35-44	7(15%)	2(40%)	9 (17%)	9(16%)	4(67%)	13 (21%)
	45-54	10(21%)	1(20%)	11 (21%)	15(27%)	-	15 (25%)
	55-64	6(13%)	-	6 (11%)	9(16%)	-	9 (15%)
	65-74	1(2%)	-	1 (2%)	1(2%)	-	1 (2%)
	75+	1(2%)	-	1 (2%)	-	-	-
BMI (kg/m2)	Underweight (<18.5)	1(2%)	-	1 (2%)	1(2%)	-	1 (2%)
	Normal (18.5-<25)	25(52%)	3(60%)	28 (53%)	26(47%)	4(67%)	30 (49%)
	Overweight (25-<30)	16(33%)	2(40%)	18 (34%)	19(35%)	1(17%)	20 (33%)
	Obese (>=30)	6(13%)	-	6 (11%)	9(16%)	1(17%)	10 (16%)
	Unknown	1(2%)	-	1 (2%)	1(2%)	-	1 (2%)
Blood Group	A	15(31%)	3(60%)	18 (34%)	22(40%)	-	22 (36%)
	AB	3(6%)	-	3 (6%)	4(7%)	-	4 (7%)
	B	5(10%)	-	5 (9%)	1(2%)	1(17%)	2 (3%)
	O	25(52%)	2(40%)	27 (51%)	28(51%)	5(83%)	33 (54%)
Ethnicity							
New Zealand European		38(79%)	3(60%)	41 (77%)	36(65%)	5(83%)	41 (67%)
New Zealand Māori		3(6%)	2(40%)	5 (9%)	4(7%)	1(17%)	5 (8%)
Pacific Islander		-	-	-	1(2%)	-	1 (2%)
Australian		-	-	-	1(2%)	-	1 (2%)
European		2(4%)	-	2 (4%)	5(9%)	-	5 (8%)
North African and Middle Eastern		-	-	-	1(2%)	-	1 (2%)
Asian		2(4%)	-	2 (4%)	6(11%)	-	6 (10%)
American		3(6%)	-	3 (6%)	1(2%)	-	1 (2%)

Ethnicity categories listed in Table 4.1, 4.2 and 4.3 are based on the Australian Bureau of Statistics (ABS) and the New Zealand (NZ) Ethnicity classifications description below:
***Australian:** Oceanian – Australian;*
***Aboriginal/Torres Strait Islander**: Oceanian - Australian Aboriginal/Torres Strait Islander*
***New Zealander:** Oceanian - New Zealand European;*
***Māori**: Oceanian - New Zealand;*
***Pacific Islander**: Oceanian - Melanesian And Papuan, Oceanian - Polynesian;*
***European**: North-West European, Southern and Eastern European, Southern and Eastern European - Italian, Southern and Eastern European – Greek;*
***North African and Middle Eastern**: North African and Middle Eastern, North African and Middle Eastern - Arab, North African and Middle Eastern – Turkish;*
***Asian**: South-East Asian, South-East Asian - Vietnamese, South-East Asian - Filipino, South-East Asian - Indonesian, South East Asian - Malay, North - East Asian, North - East Asian - Chinese, Southern and Central Asian, Southern and Central Asian – Indian;*
***American**: North American, South American, Central American;*
***Sub-Saharan African**: Sub-Saharan African*

Donor Age and Gender

In Australia in 2016, 11.7% of donors (59) were 65-74 years of age and 3% (15 donors) were aged 75 years or older. The oldest donor was 82.4 years and the youngest was less than 1 year. In New Zealand in 2016, 16.4% of donors (10) were 65 years or older. The age range was from 17 years to 80 years.

The mean age of donors in Australia in 2016 was 45.1 years. The mean age in New Zealand was 48 years. The mean age of donors in 1989 for Australia and New Zealand combined was 32.4 years and the age range was between 16.5 months and 69.5 years.

Figures 4.1 and 4.2 show donors according to age and gender in Australia and New Zealand.

Figure 4. 1 Age and Genderof Deceased Donors Australia 2008-2016

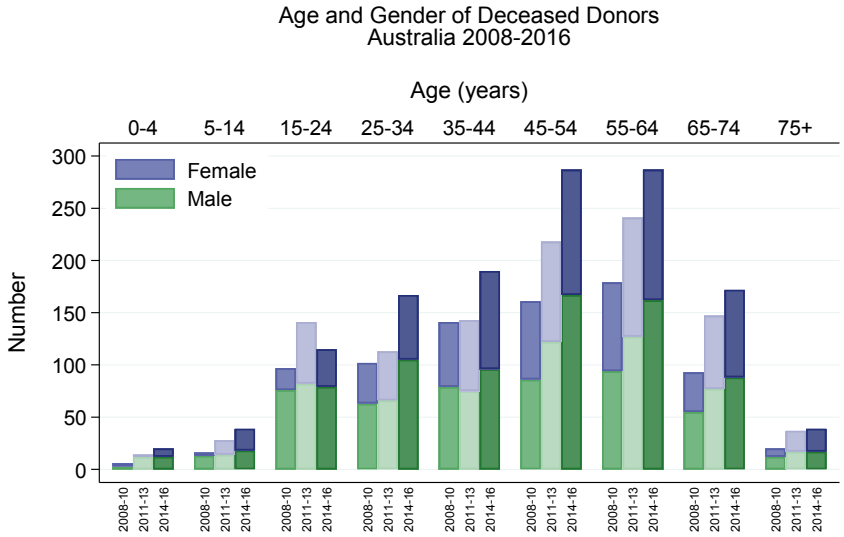
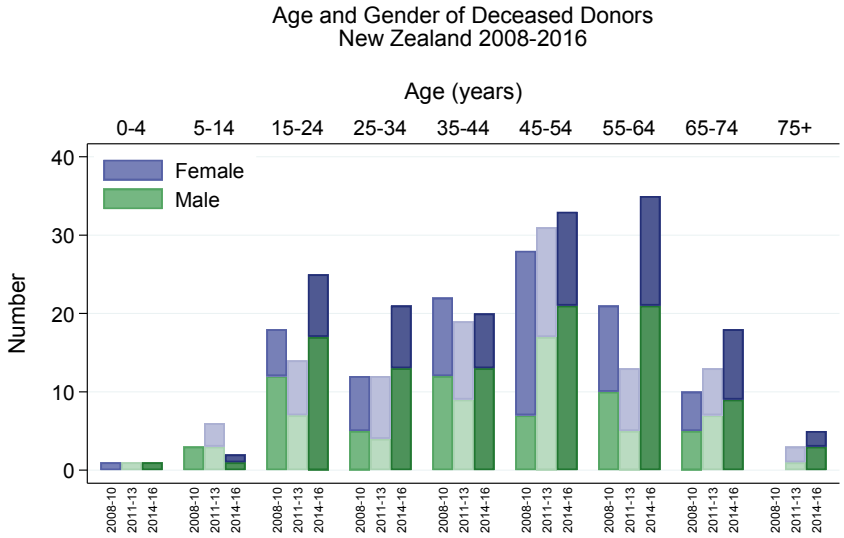
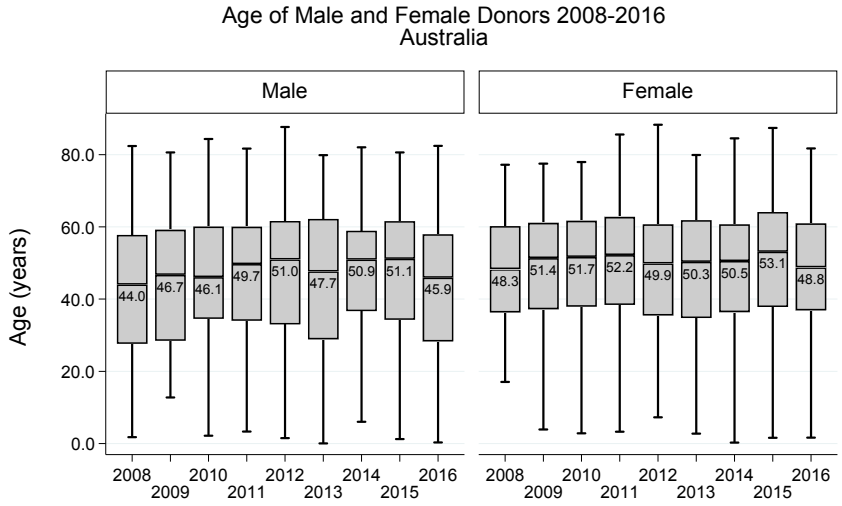


Figure 4. 2 Age and Gender of Deceased Donors New Zealand 2008-2016



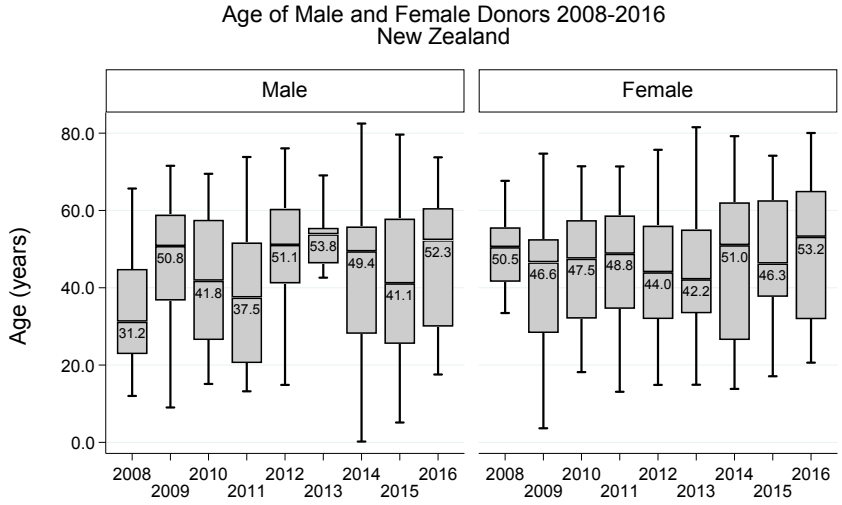
The median age for Australian donors in 2016 was 46.9 years. (Figure 4.7). The median age of donors for Australian States in 2016 ranged from 41.4 years in the Queensland to 56.7 years in the Australian Capital Territory.

Figure 4. 3 Age of Male and Female Donors 2008 - 2016 Australia



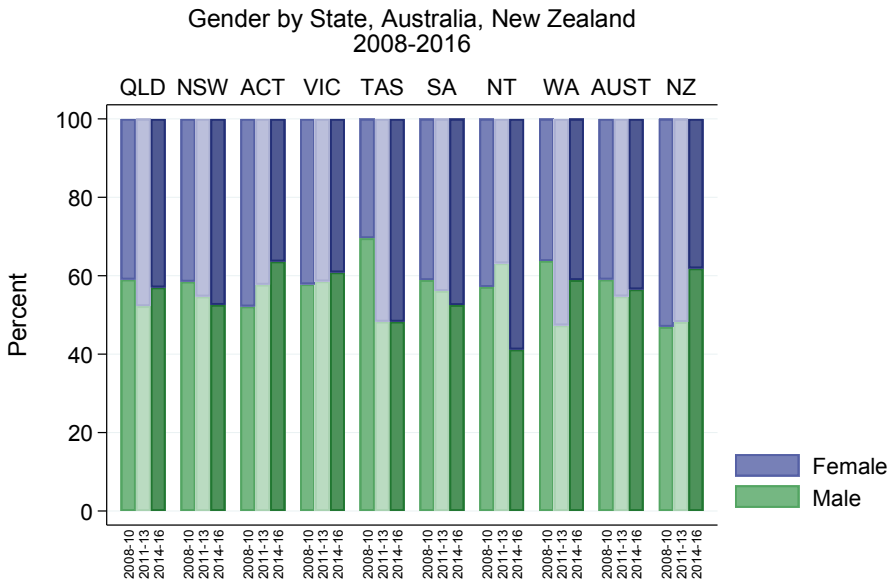
The median age for New Zealand was 53.1 years in 2016 (Figure 4.4). There was one donor aged 75 years or over and no donors aged less than 15 years.

Figure 4. 4 Age of Male and Female Donors 2008 - 2016 New Zealand



Donor gender in each State, Australia and New Zealand is shown in three-year cohorts in Figures 4.5.

Figure 4. 5 Gender by State, Australia & New Zealand 2008 - 2016



Donor Ethnic Origins

There have been no significant changes in the documented ethnicity of donors over the past five years in either Australia or New Zealand (Table 4.3).

Table 4.3

Ethnic Origin of Donors, 2012-2016										
Donor racial / ethnic origin	**Australia**					**New Zealand**				
	2012	**2013**	**2014**	**2015**	**2016**	**2012**	**2013**	**2014**	**2015**	**2016**
Australian	320 (90%)	335 (86%)	286 (76%)	326 (75%)	385 (77%)	-	-	4 (9%)	-	1 (2%)
Australian Aboriginal/ Torres Strait Islander	4 (1%)	8 (2%)	9 (2%)	11 (3%)	20 (4%)	-	-	-	-	-
New Zealander	-	-	7 (2%)	5 (1%)	4 (1%)	28 (74%)	29 (81%)	27 (59%)	41 (77%)	41 (67%)
Māori	4 (1%)	4 (1%)	1 (0%)	1 (0%)	5 (1%)	6 (16%)	3 (8%)	6 (13%)	5 (9%)	5 (8%)
Pacific Islander	2 (1%)	3 (1%)	2 (1%)	4 (1%)	3 (1%)	1 (3%)	-	1 (2%)	-	1 (2%)
European	11 (3%)	8 (2%)	31 (8%)	44 (10%)	43 (9%)	-	-	4 (9%)	2 (4%)	5 (8%)
North African and Middle Eastern	1 (0%)	3 (1%)	2 (1%)	4 (1%)	2 (0%)	-	-	-	-	1 (2%)
Asian	11 (3%)	22 (6%)	25 (7%)	32 (7%)	34 (7%)	3 (8%)	3 (8%)	1 (2%)	2 (4%)	6 (10%)
American	-	-	10 (3%)	5 (1%)	4 (1%)	-	-	2 (4%)	3 (6%)	1 (2%)
Sub-Saharan African	1 (0%)	-	5 (1%)	3 (1%)	3 (1%)	-	-	1 (2%)	-	-
Not reported	-	8 (2%)	-	-	-	-	1 (3%)	-	-	-

Ethnicity categories listed in Table 4.3 are based on the Australian Bureau of Statistics (ABS) and the New Zealand (NZ) Ethnicity classifications.

Donor Religion

Table 4.4 shows the religion of donors. This has remained stable over the 5 years to 2016.

Table 4.4

Religion of Donors, 2012-2016										
Donor Religion	**Australia**					**New Zealand**				
	2012	**2013**	**2014**	**2015**	**2016**	**2012**	**2013**	**2014**	**2015**	**2016**
Christianity	110 (31%)	122 (31%)	96 (25%)	136 (31%)	150 (30%)	5 (13%)	3 (8%)	4 (9%)	3 (6%)	4 (7%)
Judaism	-	3 (1%)	2 (1%)	2 (0%)	1 (0%)	-	-	-	-	1 (2%)
Islam	1 (0%)	2 (1%)	-	1 (0%)	3 (1%)	-	-	-	-	-
Buddhism	4 (1%)	1 (0%)	7 (2%)	6 (1%)	8 (2%)	-	-	-	-	-
Hinduism	2 (1%)	-	2 (1%)	3 (1%)	4 (1%)	-	1 (3%)	-	-	-
Others	-	5 (1%)	3 (1%)	4 (1%)	6 (1%)	-	-	-	-	-
No religion	59 (17%)	77 (20%)	87 (23%)	92 (21%)	123 (24%)	-	-	1 (2%)	-	-
Unknown	178 (50%)	181 (46%)	181 (48%)	191 (44%)	208 (41%)	33 (87%)	32 (89%)	41 (89%)	50 (94%)	56 (92%)

Donor Weight

The allocation of heart, lungs and livers are based in part on the matching of recipient and donor size and weight. In 2016 there were 19 donors in Australia and no donors in New Zealand who weighed less than 40 kilograms. There were 57 donors 100 kilograms and over in Australia and nine donors in New Zealand. (Table 4.5)

Table 4.5

Donor Weight in kilograms 2012 – 2016												
		0-19	**20-29**	**30-39**	**40-49**	**50-59**	**60-69**	**70-79**	**80-89**	**90-99**	**100+**	**Total**
AUSTRALIA	**2012**	2	4	0	7	23	73	70	85	44	46	**354**
	2013	10	2	3	7	24	62	95	90	53	45	**391**
	2014	4	4	2	4	29	53	104	86	54	38	**378**
	2015	7	4	3	8	33	70	93	86	63	68	**435**
	2016	9	6	4	10	34	82	115	113	73	57	**503**
NEW ZEALAND	**2012**	0	0	0	0	6	5	10	5	8	4	**38**
	2013	1	0	1	0	3	9	11	4	5	2	**36**
	2014	1	0	0	0	3	8	7	16	7	4	**46**
	2015	0	1	0	0	3	12	12	11	10	4	**53**
	2016	0	0	0	1	8	9	17	12	5	9	**61**

Donor Medical Conditions

Table 4.6 lists the medical conditions of donors by States, Territories and Country for 2016 by Donor type.

Table 4.6

Comorbid Medical Conditions of Actual Deceased Donors 2016											
Donor Type	**Medical Condition**	**QLD**	**NSW**	**ACT**	**VIC**	**TAS**	**SA**	**NT**	**WA**	**AUS**	**NZ**
DBD	**Diabetes Type I**	2	3	1	1	0	0	0	0	7	0
	Diabetes Type II	4	10	0	1	1	3	0	2	21	2
	Hypertension	23	28	6	20	3	9	2	10	101	19
	Smoking-Current	40	33	4	28	4	16	1	23	149	16
	Cancer	1	13	1	2	1	4	0	2	24	3
DCD	**Diabetes Type I**	1	0	0	0	0	0	0	0	1	0
	Diabetes Type II	1	4	0	5	0	0	0	0	10	0
	Hypertension	4	13	3	14	1	1	0	1	37	1
	Smoking-Current	4	10	2	23	0	3	1	2	45	2
	Cancer	1	4	1	3	0	0	0	0	9	1

Diabetes

There were 39 donors with diabetes in Australia in 2016, eight donors with Type 1 and 31 with Type 2 diabetes. There were 2 donors in New Zealand with diabetes, both with Type 2. In Australia, there were no diabetic donors that did not have organs retrieved. The 31 Type 2 donors provided 88 organ and tissue grafts for transplantation. This included on Double adult kidney, 39 single kidneys, 13 livers, six double lungs and three hearts. The eight Type 1 diabetic donors, provided 20 organs; eight single kidneys, six livers, three double lungs, two hearts and one single lung.

In New Zealand, the two Type 2 diabetic donors provided a liver and a double lung transplant.

Hypertension

A past history of hypertension was recorded in 27.4% of donors (137) in Australia and 32.7% (20) donors in New Zealand in 2016. (Table 4.6)

Smoking

In 2016, 38.5% (186) of Australian donors were recorded as current smokers while in New Zealand, 29.5% (18) donors were reported as current smokers.

Cancer in Donor

In Australia, 33 donors had a past history of cancer prior to donation. There were 12 donors with skin only cancers, 16 with non-skin cancers, one donor with both skin and nonskin cancer history and four donors of an uncertain cancer history. In New Zealand, four donors had a past history of cancer, three with non-skin cancer diagnoses and one with a history of skin cancer.

Virology Screening

Table 4.7 lists the cytomegalovirus (CMV) status of donors by Country from 2011 to 2016.

Table 4.7

Cytomegalovirus (CMV IgG) Status of Donors, 2011 – 2016												
	Australia						New Zealand					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Positive	214	225	242	228	268	332	21	30	21	23	26	33
Negative	123	129	148	148	167	169	17	8	15	23	27	26
Unknown	0	0	1	2	0	2	0	0	0	0	0	2
Indeterminate	0	0	0	0	0	0	0	0	0	0	0	0
Pending	0	0	0	0	0	0	0	0	0	0	0	0
Total	**337**	**354**	**391**	**378**	**435**	**503**	**38**	**38**	**36**	**46**	**53**	**61**

Table 4.8 shows the Epstein-Barr Virus (EBV) status of donors from 2011 to 2016.

Table 4.8

Epstein-Barr Virus (EBV IgG) Status of Actual Deceased Donors, 2011 – 2016												
	Australia						New Zealand					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Positive	293	321	356	339	402	462	27	33	27	37	36	53
Negative	28	33	33	30	28	38	4	1	4	5	13	6
Unknown	16	0	2	5	1	2	7	4	5	3	3	2
Indeterminate	0	0	0	1	0	1	0	0	0	1	0	0
Pending	0	0	0	3	4	0	0	0	0	0	1	0
Total	**337**	**354**	**391**	**378**	**435**	**503**	**38**	**38**	**36**	**46**	**53**	**61**

Table 4.9 shows there were eighteen Hepatitis C positive consented donors in 2016 reported to the Registry; seventeen in Australia and one in New Zealand.

Table 4.9

Hepatitis C Antibody Status of Donors (Anti-HCV), 2011 - 2016												
	Australia						New Zealand					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Positive	7	5	13	8	11	17	1	2	1	2	1	1
Negative	330	349	378	364	420	482	37	36	35	44	52	59
Unknown	0	0	0	6	4	4	0	0	0	0	0	1
Indeterminate	0	0	0	0	0	0	0	0	0	0	0	0
Total	**337**	**354**	**391**	**378**	**435**	**503**	**38**	**38**	**36**	**46**	**53**	**61**

Table 4.10 shows the results of consented donors tested since 2011 to 2016.

Table 4.10

Hepatitis B Core Antibody Status of Donors (Anti-HBcAb), 2011 – 2016												
	Australia						New Zealand					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Positive	11	15	17	21	20	19	5	8	2	3	3	7
Negative	326	339	374	337	394	473	33	30	34	42	50	54
Unknown	0	0	0	20	21	11	0	0	0	1	0	0
Indeterminate	0	0	0	0	0	0	0	0	0	0	0	0
Total	**337**	**354**	**391**	**378**	**435**	**503**	**38**	**38**	**36**	**46**	**53**	**61**

Since 1993, all consented donors in Australia and New Zealand have been tested for Hepatitis B surface antigen. Table 4.11 shows the status of donors tested since 2011 to 2016.

Table 4.11

Hepatitis B Surface Antigen Status of Donors (HBsAg), 2011 - 2016												
	Australia						New Zealand					
	2011	2012	2013	2014	2015	2016	2011	2012	2013	2014	2015	2016
Positive	0	0	2	1	0	2	0	0	2	1	0	1
Negative	337	354	389	375	431	499	38	38	34	45	53	60
Unknown	0	0	0	2	4	2	0	0	0	0	0	0
Indeterminate	0	0	0	0	0	0	0	0	0	0	0	0
Total	**337**	**354**	**391**	**378**	**435**	**503**	**38**	**38**	**36**	**46**	**53**	**61**

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 4: Deceased Organ Donor Profile. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at www.anzdata.org.au

SECTION 5

Deceased Donor Kidney Donation

SUMMARY

This section summarises kidney donation activity from deceased donor in 2016, compared with previous years. Both countries reached their highest rate of kidneys transplanted in 2016, with 34 pmp in Australia and 19.2 pmp in New Zealand.

Contents

Table of Figures

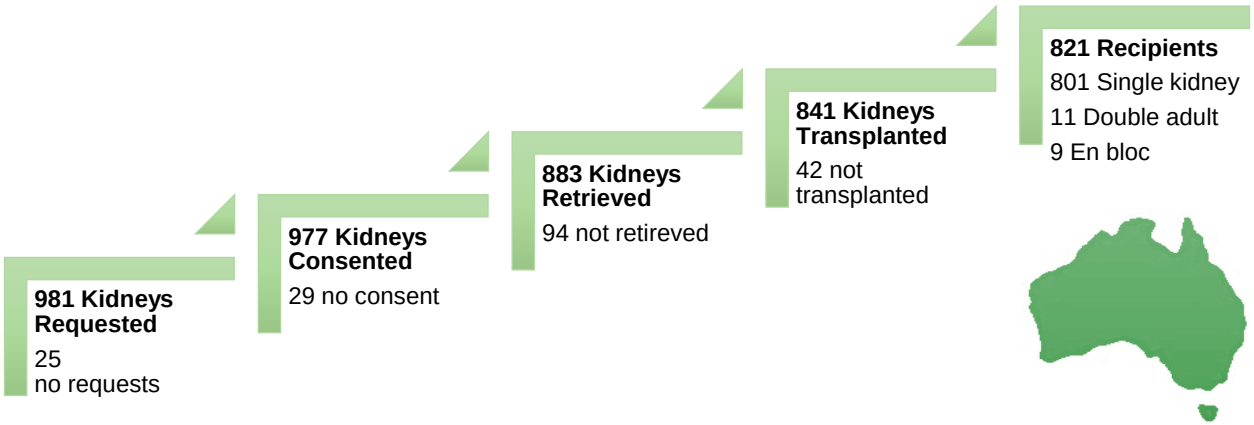
Kidney Donation

Of the 503 deceased organ donors in 2016 in Australia, 491 (97.6%) were kidney donors. From these kidney donors, 883 kidneys were retrieved resulting in 821 kidney recipients. Of the 821 kidney transplant recipients, there were 46 kidney/pancreas recipients, 11 double adult kidney recipients, nine en bloc kidney recipients, four combined kidney/liver recipients and one combine kidney heart transplant recipient.

There were 640 kidney transplant procedures from the brain death donation pathway and 201 kidneys following donation after circulatory death.

There was an overall increase of 16.8% in the total number of kidney transplants recipients (821) compared to the previous year (703); an increase to 34 per million population (pmp) from 29.6 (pmp).

Figure 5.1 Outcomes of Request for Kidney Donation from Actual Donors in Australia 2016



In New Zealand, there donors 60 donors (98.3%) who consented to kidney donation. From these kidney donors, 99 kidneys were retrieved resulting in 90 kidney recipients. There were 85 kidneys transplanted from the brain death donation pathway and ten kidneys transplanted following donation after circulatory death.

Of the 90 recipients, four received a combined kidney/pancreas, one received a combined kidney/liver transplant and one underwent a combine kidney/heart transplant procedure. There were 5 double adult kidney transplants and no en bloc kidney transplants in 2016.

There was an overall increase of 23.3% in the total number of kidney transplant recipients (90) in 2016 compared to the previous year (73). Figures 5.2 shows the outcomes of requests for kidney donation, in New Zealand.

Figure 5.2 Outcomes of Request for Kidney Donation from Actual Donors in New Zealand 2016

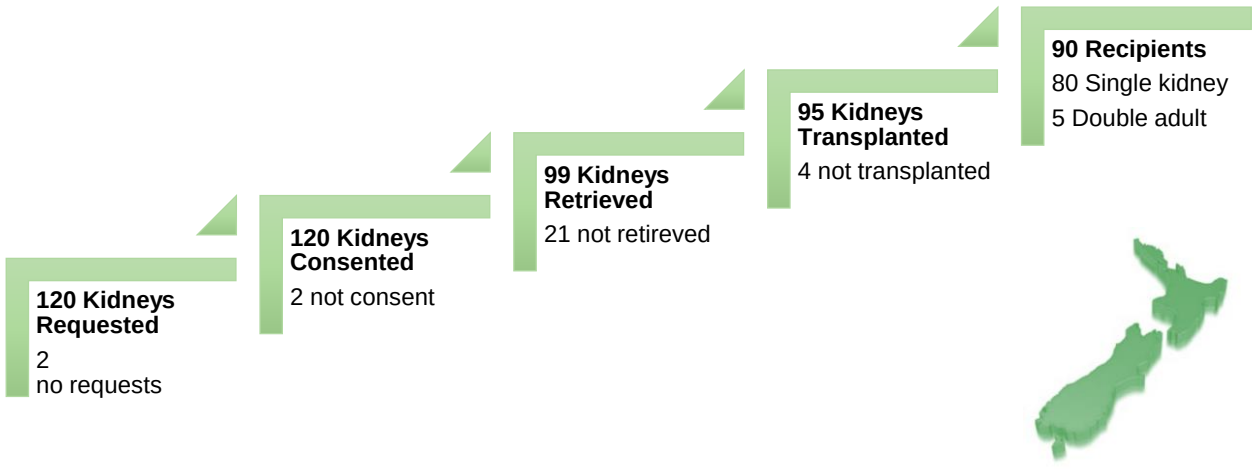


Figure 5.3 to 5.5 show the number of kidney transplants by donation pathway and the number of kidney recipients by jurisdiction. Figure 5.3 particularly shows an increase in DCD kidneys from 2006 to 2016, and DBD kidneys from 2010 to 2016 in Australia.

Figure 5.3 Kidneys Transplanted by Donation Pathway - Australia, 1998 - 2016

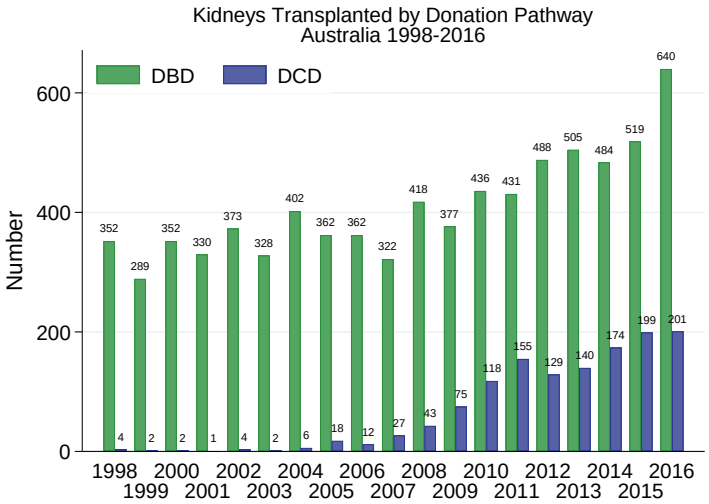


Figure 5.4 Kidneys Transplanted by Donation Pathway - New Zealand, 1998 - 2016

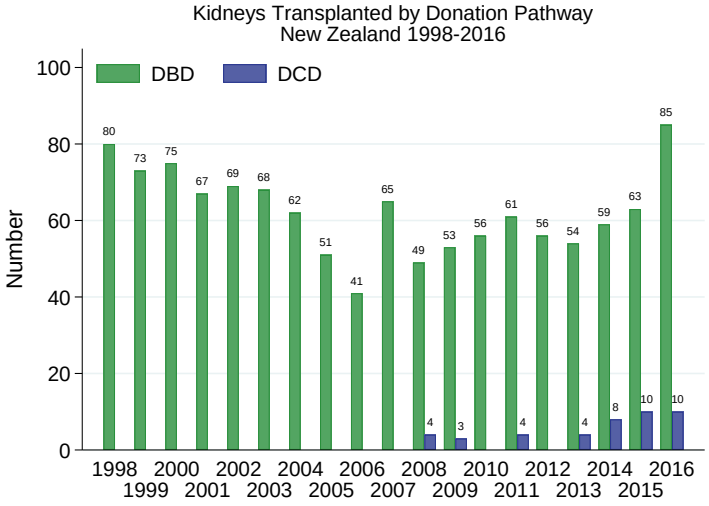
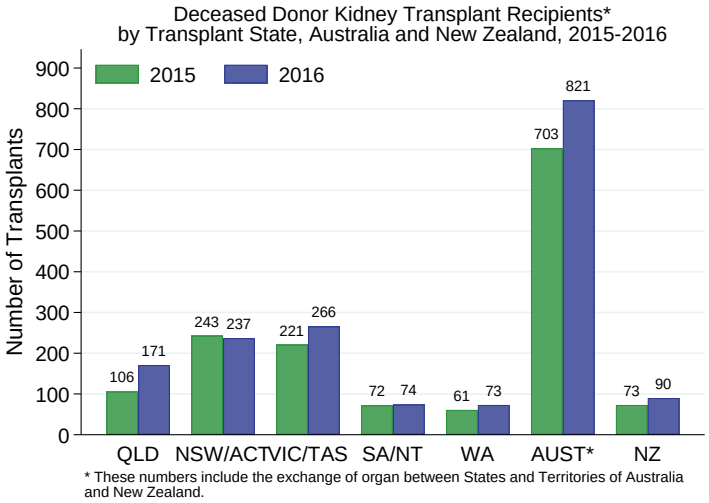


Figure 5.5 Deceased Donor Kidney Transplant Recipients by State, Australia & New Zealand, 2015 vs 2016



Age of Kidney Donors

The age distribution of donors providing transplanted kidneys for Australia and New Zealand is shown in Figures 5.6 and 5.7 respectively.

Figure 5.6 Age of Donors Providing Transplant Kidneys, Australia, 2016

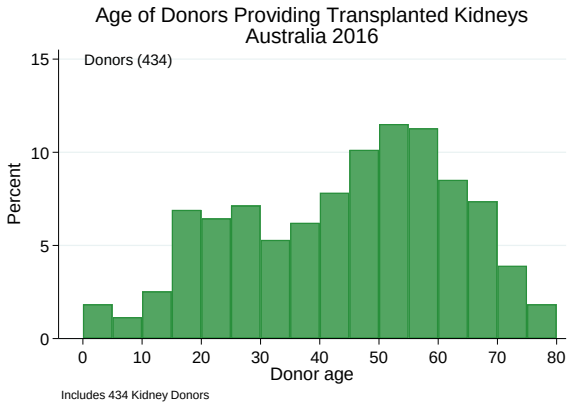
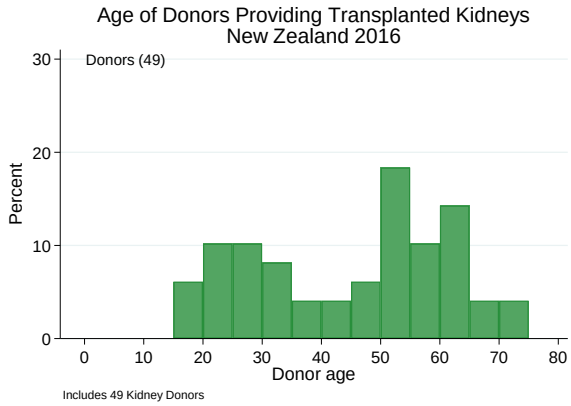


Figure 5.7 Age of Donors Providing Transplant Kidneys, New Zealand, 2016



Donor Kidney Function

Table 5.1 Terminal Serum Creatinine Levels 2012-2016

Creatinine (µmol/L)	Australia					New Zealand				
	2012	2013	2014	2015	2016	2012	2013	2014	2015	2016
00 - 99	75%	79%	77%	71%	74%	87%	81%	83%	88%	69%
100 - 124	9%	7%	7%	7%	8%	10%	6%	15%	10%	19%
125 - 149	5%	4%	4%	5%	4%	3%	6%	-	2%	4%
150 - 174	2%	3%	2%	3%	3%	-	3%	-	-	4%
175 - 199	2%	2%	1%	3%	2%	-	-	2%	-	-
200 - 224	1%	1%	2%	1%	1%	-	-	-	-	2%
225 - 249	1%	0%	0%	1%	1%	-	3%	-	-	-
≥ 250	4%	4%	5%	9%	7%	-	-	-	-	4%

In 2016 in Australia, 91 donors (18%)had a terminal serum creatinine concentration of >=125 µmol/L

In 2016 in New Zealand, 7 donors (12%)had a terminal serum creatinine concentration of >=125 µmol/L

In Australia ,68 donors (14%) had a terminal serum urea concentration of >= 9 mmol/L and creatinine concentration of >=125 µmol/L

In New Zealand ,4 donors (7%) had a terminal serum urea concentration of >= 9 mmol/L and creatinine concentration of >=125 µmol/L

Kidneys Not Retrieved

In 2016, there were 94 kidneys not retrieved from Australian donors and 21 not retrieved from New Zealand donors.

For Australia, the main reason was due to the kidney not being medically suitable (60), followed by no suitable recipient for the kidney (20). In New Zealand, there were 19 non-retrieved kidneys due to not being medically suitable and 2 due to trauma to the organ.

Table 5.2 Reasons for Kidney Not Retrieved in 2016

Reason	Australia	New Zealand
Logistics	2	0
Not Medically Suitable	60	19
Surgically Unsuitable	0	0
Trauma to Organ	4	2
No Suitable Recipients	20	0
Age of Donor	2	0
DCD Donor	2	0
Consent Withdrawn	0	0
Others	4	0
Total	**94**	**21**

Kidneys Retrieved and Not utilised

The reasons why kidneys were not utilised for organ transplantation is presented in Table 5.2.

Table 5.3 Reasons Kidneys Retrieved & Not Utilised for Transplantation, Australia (New Zealand) 2012 - 2016

Year	Logistics	Not Medically Suitable	Not Surgically Suitable	No Suitable Recipients	Other	Total
2012	0 (0)	9 (1)	7 (0)	2 (0)	1 (0)	19 (1)
2013	3 (0)	32 (3)	7 (0)	3 (0)	1 (0)	46 (3)
2014	0 (0)	32 (6)	3 (1)	5 (0)	2 (0)	42 (7)
2015	0 (0)	38 (4)	3 (1)	2 (0)	2 (0)	45 (5)
2016	0 (0)	35 (3)	2 (0)	5 (1)	0 (0)	42 (4)

Figures 5.8 and 5.9 show the non-utilisation rate of retrieved kidneys – the proportion of kidneys that were retrieved for the purpose of solid organ transplantation, but not ultimately transplanted into a recipient (either due to an absence of suitable recipients, or the kidney being found to be medically or surgically unsuitable after retrieval).

Figure 5.8 Non-Utilisation Rate of Retrieved Kidneys, Australia, 2012-2016

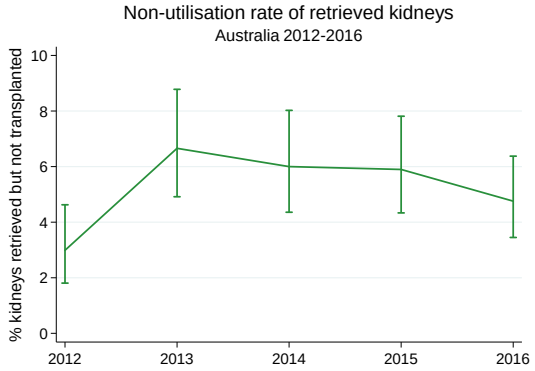
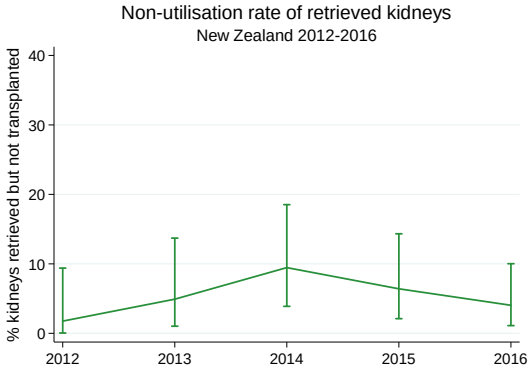


Figure 5.9 Non-Utilisation Rate of Retrieved Kidneys, New Zealand, 2012-2016



Outcome of Kidney Donation

The outcome of kidney donation activity in Australia and New Zealand throughout the donation pathway is shown in tables 5.4 and 5.5 respectively.

Table 5.4 Outcome of Request for Kidney Donation in Australia 2012 - 2016

Country	Outcome of Request	2012	2013	2014	2015	2016
AUSTRALIA	**Total Donors**	**354**	**391**	**378**	**435**	**503**
	Kidneys Requested for Donation	690	760	738	828	981
	Kidneys Not Requested for Donation	18	22	18	42	25
	Kidneys with Consent Given	688	758	738	824	977
	Kidneys with Consent Not Given	20	24	18	46	29
	Kidneys Retrieved	**636**	**691**	**700**	**763**	**883**
	Kidneys Not Retrieved	52	67	38	61	94
	Total Kidneys Not Used	18	45	42	45	42
	Kidney used for Research	1	1	0	0	0
	Kidneys Transplanted	**617**	**645**	**658**	**718**	**841**
	Double/Enbloc Kidney Transplanted	20	30	44	30	40
	Recipient Transplanted	**607**	**630**	**636**	**703**	**821**
	Double Adult Kidney Procedures	8	9	17	9	11
	En Bloc Kidney Procedures	2	6	5	6	9
	Kidney Discard Rate	2.99%	6.66%	6%	5.90%	4.76%
	Kidney Utilised Rate	**97.01%**	**93.34%**	**94%**	**94.10%**	**95.24%**

Table 5.5 Outcome of Request for Kidney Donation in New Zealand 2012 - 2016						
Country	**Outcome of Request**	**2012**	**2013**	**2014**	**2015**	**2016**
NEW ZEALAND	**Total Donors**	**38**	**36**	**46**	**53**	**61**
	Kidneys Requested for Donation	74	68	88	100	120
	Kidneys Not Requested for Donation	2	4	4	6	2
	Kidneys with Consent Given	72	68	88	100	120
	Kidneys with Consent Not Given	4	4	4	6	2
	Kidneys Retrieved	**57**	**61**	**74**	**78**	**99**
	Kidneys Not Retrieved	15	7	14	22	21
	Total Kidneys Not Used	1	3	7	5	4
	Kidney used for Research	0	0	0	0	0
	Kidneys Transplanted	**56**	**58**	**67**	**73**	**95**
	Double/Enbloc Kidney Transplanted	0	6	2	0	10
	Recipient Transplanted	**56**	**55**	**66**	**73**	**90**
	Double Adult Kidney Procedures	0	2	0	0	5
	En Bloc Kidney Procedures	0	1	1	0	0
	Kidney Discard Rate	1.75%	4.92%	9.46%	6.41%	4.04%
	Kidney Utilised Rate	**98.25%**	**95.08%**	**90.54%**	**93.59%**	**95.96%**

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 5: Deceased Donor Kidney Donation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at www.anzdata.org.au

SECTION 6

Deceased Donor Liver Donation

SUMMARY

This section summarises liver donation activity from deceased donors in 2016, compared with previous years. Both countries reached their highest rate of livers transplanted in 2016, with 13 pmp in Australia and 11.3 pmp in New Zealand.

Contents

Table of Figures

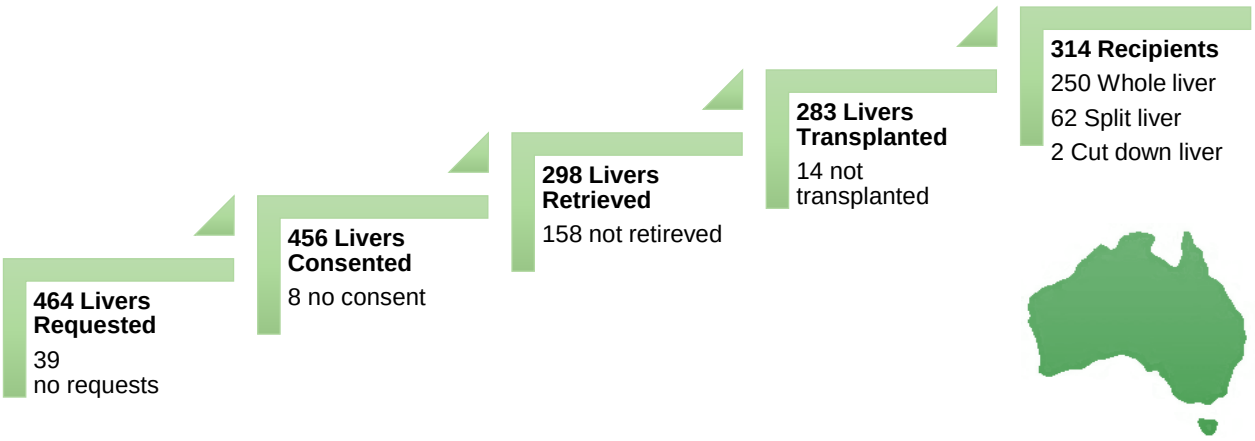
Liver Donation

Of the 503 deceased organ donors in 2016, 298 (59.2%) were liver donors. From these liver donors, there were 314 recipients in Australia. Five recipients received a combined liver/kidney transplant, one received a combined liver/pancreas and one a liver/intestine transplant.

Sixty-two partial liver transplants were performed in Australia using the "split" liver technique (transplanting one liver into two recipients) and two recipients received a 'cut down' liver.

There was an increase of 18.9% in the number of liver transplants in Australia compared to the previous year; a rate of 13 liver transplants per million of population (pmp). Figures 6.1 shows the outcomes of requests for liver donation in Australia.

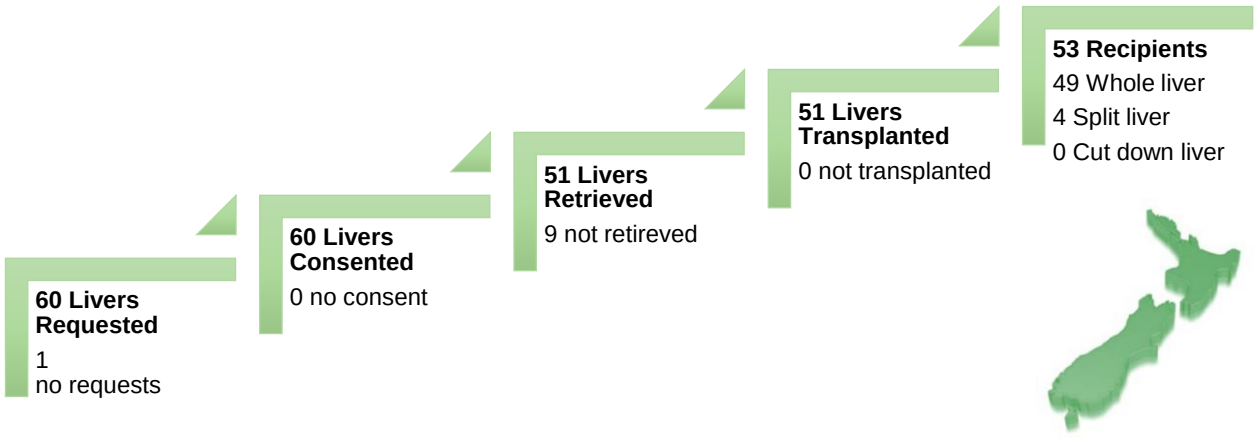
Figure 6.1 Outcomes of Request for Liver Donation in Australia 2016



In New Zealand there 51 livers retrieved providing for 53 liver recipients. Of these, there were four split liver transplants performed.

There was an increase of 15.2% in the number of liver transplants in New Zealand compared to the previous year; a rate of 11.3 liver transplants per million of population (pmp). Figures 6.2 shows the outcomes of requests for liver donation in New Zealand.

Figure 6. 2 Outcomes of Request for Liver Donation in New Zealand 2016



Figures 6.3 and 6.4 show the number of recipients of liver transplants by donation pathway in Australia and New Zealand respectively from 1998 to 2016. Figure 6.5 compares the number of deceased donor liver recipients by state and country for 2014 and 2015.

Figure 6.3 Recipients of Liver Transplantation by Donation Pathway, Australia 1998 - 2016

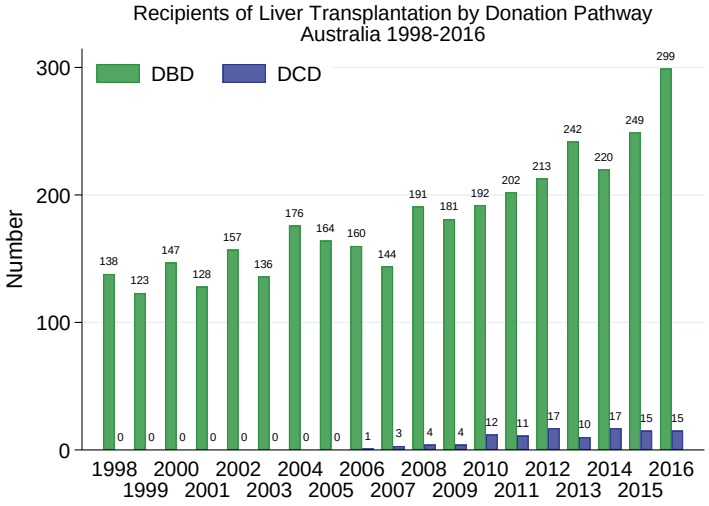


Figure 6.4 Recipients of Liver Transplantation by Donation Pathway, New Zealand 1998 - 2016

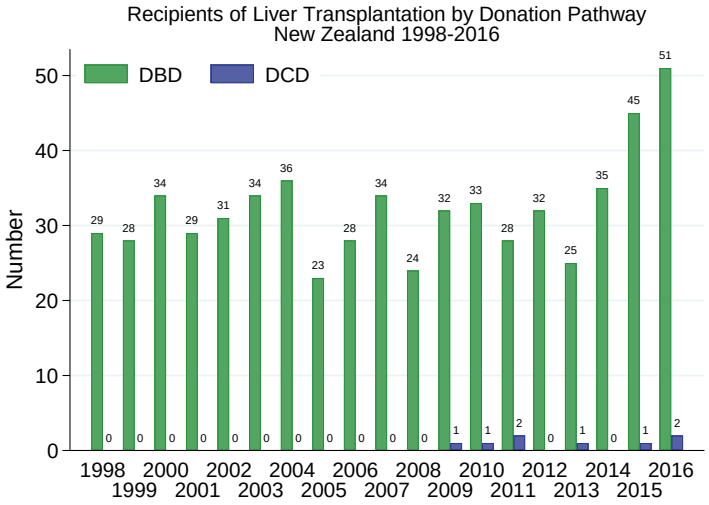
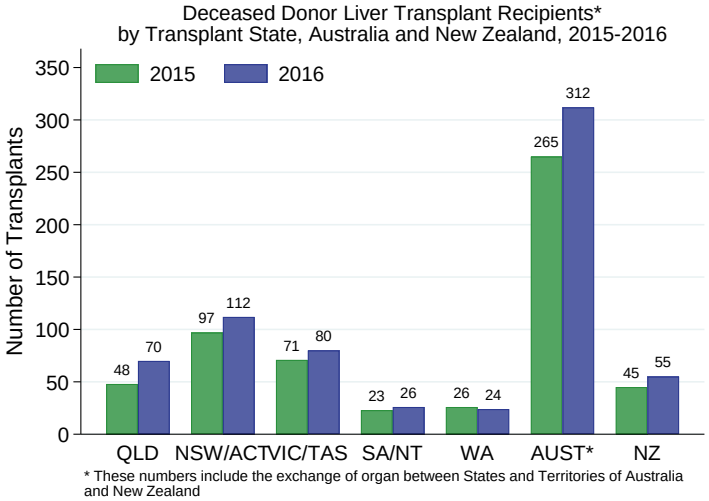


Figure 6.5 Deceased Donor Liver Transplant Recipients by Transplant State, Australia & New Zealand, 2015 - 2016



Age of Liver Donors

The age distribution of donors providing transplanted livers for Australia and New Zealand is shown in Figures 6.6 and 6.7 respectively.

Figure 6.6 Age of Donors Providing Transplant Livers, Australia, 2016

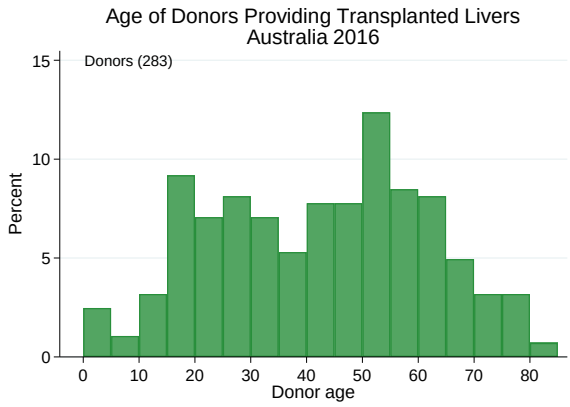
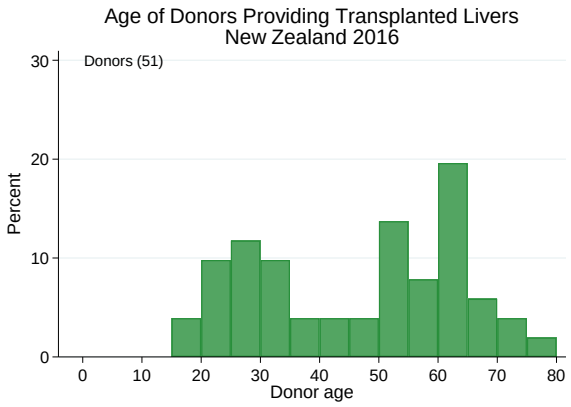


Figure 6.7 Age of Donors Providing Transplant Livers, New Zealand, 2016



Donor Liver Function

The results of the serum tests for liver function for 298 Australian and 51 New Zealand donors in 2016 who had livers retrieved, are shown below. There were 91.6% of donors in Australia (273) and 50.9% of donors in New Zealand (26) who had all five tests performed. Table 6.1 shows the number of donors whose liver function was above the normal range.

Table 6.1 Number of Donors with Liver Function Tests Above Normal, 2016

	Australia		New Zealand	
Liver Function Tests	**Donors with value recorded***	**Above Normal**	**Donors with value recorded***	**Above Normal**
Alanine Transaminase ALT > 40 µ/L	298	135	42	13
Aspartate Transaminase AST > µ/L	273	145	35	13
Gamma Glutamol Tranferase GGT > 60 µ/L	298	71	42	7
Alkaline Phosphatase > 116 µ/L	298	49	50	3
Total Bilirubin > 20 µmol/L	298	31	50	7
All 5 tests completed	273		26	
At least 1 test completed	298		50	

**Not all donors have all tests*

Livers Not Retrieved

There were 158 livers not retrieved from Australian donors in 2016 and 9 livers from New Zealand donors.

For Australia, the main reasons were the liver was not medically suitable for transplantation (116), followed by age of donor (19). In New Zealand, mostly non-retrieved livers were due to being not medically suitable (4). Figure 6.2 provides a breakdown of the reason why livers were not retrieved.

Table 6.2 Reasons for Lung Not Retrieved, 2016

Reason	Australia	New Zealand
Logistics	8	0
Not Medically Suitable	116	4
Surgically Unsuitable	0	0
Trauma to Organ	1	1
No Suitable Recipients	10	3
Age of Donor	19	0
DCD Donor	3	1
Consent Withdrawn	1	0
Others	0	0
Total	**158**	**9**

Livers Retrieved and Not utilised

Table 6.3 tabulates the reasons livers were not used after retrieval for the purpose of transplantation since 2012.

Table 6.3 Reasons Liver Retrieved and Not Utilised for Transplantation in Australia (New Zealand), 2012 - 2016

Year	Logistics	Not Medically Suitable	Not Surgically Suitable	No Suitable Recipients	Other	Total
2012	0 (0)	5 (1)	0 (0)	0 (0)	1 (0)	6 (1)
2013	0 (0)	6 (1)	0 (0)	0 (0)	0 (0)	6 (1)
2014	0 (0)	6 (1)	0 (0)	0 (0)	1 (0)	7 (1)
2015	0 (0)	13 (0)	0 (0)	0 (0)	0 (0)	13 (0)
2016	0 (0)	12 (0)	0 (0)	0 (0)	2 (0)	14 (0)

Figures 6.8 and 6.9 show the non-utilisation rate of retrieved livers - the proportion of livers that were retrieved for the purpose of solid organ transplantation, but not ultimately transplanted into a recipient (either due to absence of suitable recipients, or the liver being found to be medically or surgically unsuitable after retrieval).

In Australia, the non-utilisation rate of livers has increased from 0.5% in 2011 to 7.9% in 2014. In 2015, this fell to just under 6.5%.

Figure 6.8 Non-Utilisation Rate of Retrieved Liver Australia, 2012 - 2016

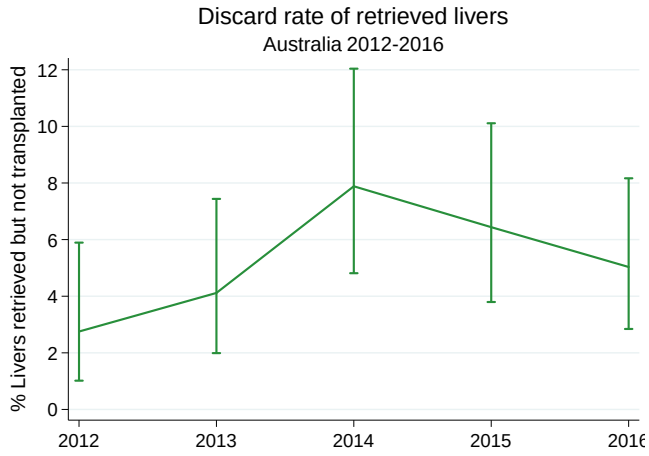
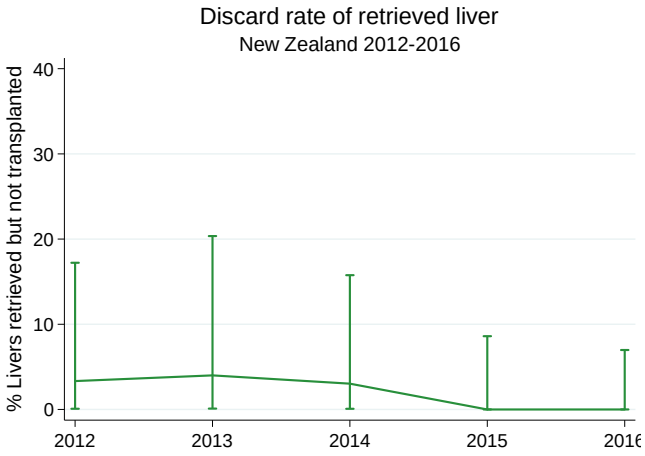


Figure 6.9 Non-Utilisation Rate of Retrieved Liver, New Zealand, 2012 - 2016



Outcome of Liver Donation

The outcome of liver donation activity in Australia and New Zealand throughout the donation pathway is shown in tables 6.4 and 6.5 respectively.

Table 6.4 Outcome of Request for Liver Donation in Australia, 2012-2016

	2012	2013	2014	2015	2016
Total Donors	**354**	**391**	**378**	**435**	**503**
No Request for Liver Donation	20	31	24	46	39
Request for Liver Donation	334	360	354	389	464
Consent Not Given	5	3	7	12	8
Consent Given	329	357	347	377	456
Liver Not Retrieved	111	112	106	113	158
Liver Retrieved	**218**	**243**	**241**	**264**	**298**
Whole Liver not used	6	6	7	13	14
(Split Liver (L) not used)	1	0	0	0	0
(Split Liver (R) not used)	3	7	0	1	2
Liver used for Research	1	4	12	4	1
Total Livers Transplanted	212	233	222	247	283
Recipients Transplanted	**230**	**252**	**237**	**264**	**314**
Whole Liver Transplanted	189	207	207	229	250
(Left Liver or Cutdown Transplant Procedures)	22	26	15	18	33
(Right Liver Transplant Procedures)	19	19	15	17	31
Split Liver Procedures	36	38	30	34	62
Cut down Liver	5	7	0	1	2
Liver Discard Rate	3.21%	4.12%	7.88%	6.44%	5.03%
Liver Utilised Rate	**97.25%**	**95.88%**	**92.12%**	**93.56%**	**94.97%**

Table 6.5 Outcome of Request for Liver Donation in New Zealand, 2012-2016					
	2012	**2013**	**2014**	**2015**	**2016**
Total Donors	**38**	**36**	**46**	**53**	**61**
No Request for Liver Donation	1	1	5	3	1
Request for Liver Donation	37	35	41	50	60
Consent Not Given	1	0	0	0	0
Consent Given	36	35	41	50	60
Liver Not Retrieved	6	10	8	9	9
Liver Retrieved	**30**	**25**	**33**	**41**	**51**
Whole Liver not used	1	1	1	0	0
(Split Liver (L) not used)	0	0	0	0	0
(Split Liver (R) not used)	2	1	0	0	0
Total Livers Transplanted	**29**	**24**	**32**	**41**	**51**
Recipients Transplanted	32	26	35	46	53
Whole Liver Transplanted	24	21	29	36	49
(Left Liver or Cutdown Transplant Procedures)	5	3	3	5	2
(Right Liver Transplant Procedures)	3	2	3	5	2
Split Liver Procedures	6	4	6	10	4
Cut down Liver	2	1	0	0	0
Liver Discard Rate	3.33%	4%	3.03%	0%	0%
Liver Utilised Rate	**96.67%**	**96%**	**96.97%**	**100%**	**100%**

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 6: Deceased Donor Liver Donation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at www.anzdata.org.au

SECTION 7

Deceased Donor Heart Donation

SUMMARY

This section summarises heart donation activity from deceased donors in 2016, compared with previous years.

Contents

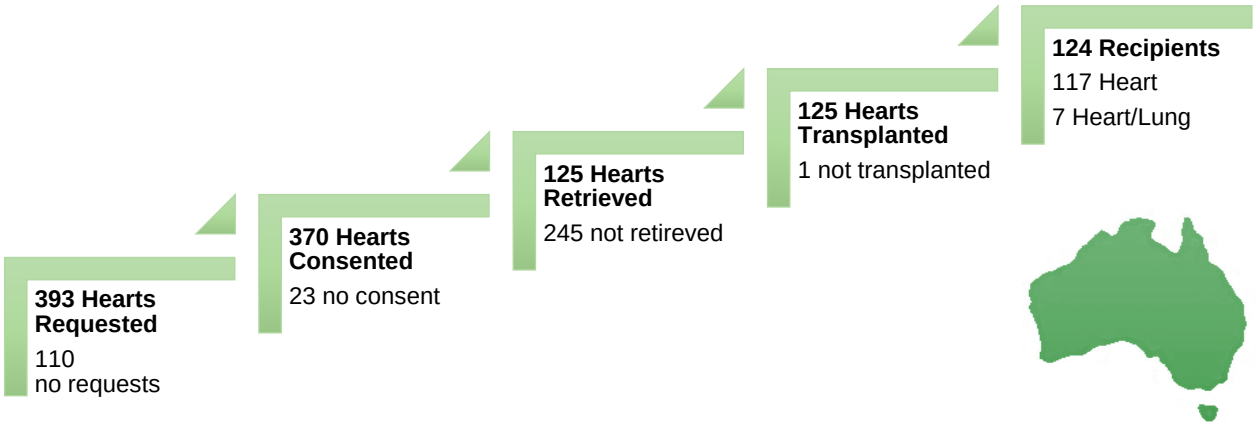
Table of Figures

Heart Donation

Of the 503 deceased organ donors in 2016 in Australia, 125 (24.8%) were heart donors. From these heart donors there were 124 heart transplant recipients (5.1 pmp). This was an increase of 30.5% in the total number of heart transplants compared with 2015 (95). Of these 124 heart transplant recipients, seven received heart/double lung transplants and one received a combine heart/kidney transplant.

Figures 7.1 and 7.2 show the outcomes of requests for heart donation in Australia and New Zealand for 2016 respectively.

Figure 7.1 Outcomes of Request for Heart Donation from Actual Donors in Australia 2016



In New Zealand, there donors 50 donors (81.9%) who consented to heart donation. From these consented donors, 11 hearts were retrieved and transplanted in 2016. One recipient received a combine heart/liver transplant and another received a combine heart/kidney transplant.

There was an overall decrease of one in the total number of heart transplant recipients (11) in 2016 compared to the previous year. Of the 11 recipients, one received a combined heart/liver transplant and one underwent a combine heart/kidney transplant procedure. There were no heart /lung transplants in 2016.

Figure 7.2 Outcomes of Request for Heart Donation from Actual Donors in New Zealand 2016

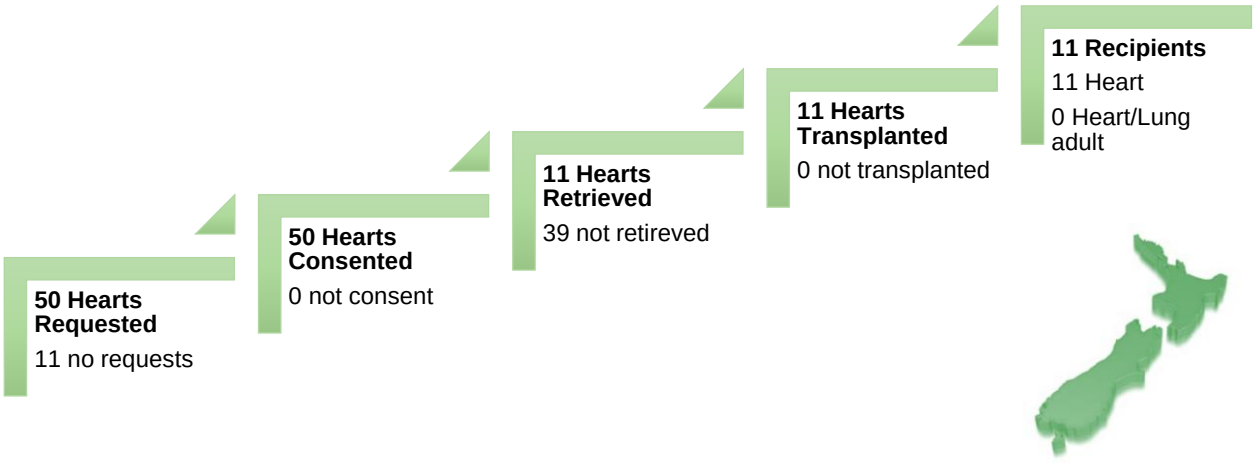


Figure 7.3 to 7.5 show the number of heart transplants by donation pathway and the number of heart recipients by jurisdiction. Figure 7.3 particularly shows an increase in DCD Hearts from 2014 to 2016, and DBD hearts from 2009 to 2016 in Australia. There were no hearts donated form DCD donors in New Zealand in 2016 (Figure 7.4)

Figure 7.3 Hearts Transplanted by Donation Pathway - Australia, 1998 - 2016

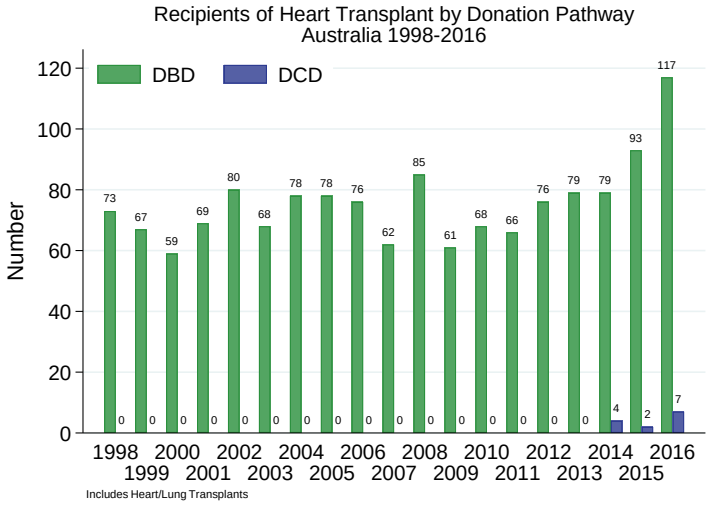


Figure 7.4 Hearts Transplanted by Donation Pathway - New Zealand, 1998 - 2016

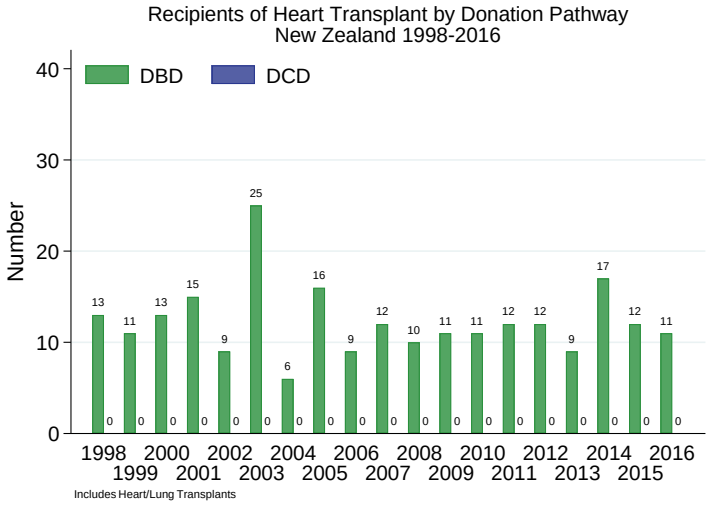
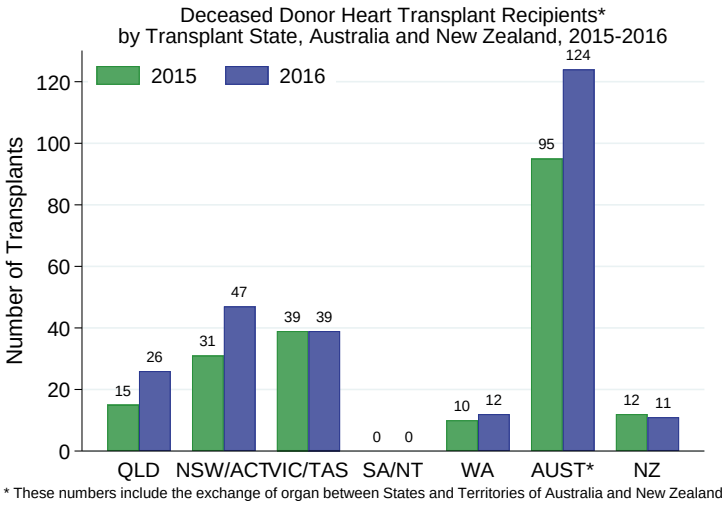


Figure 7.5 Deceased Donor Heart Transplant Recipients by State, Australia & New Zealand, 2015 vs 2016



Age of Heart Donors

The age distribution of donors providing transplanted hearts for Australia and New Zealand is shown in Figures 7.6 and 7.7 respectively.

Figure 7.6 Age of Donors Providing Transplant Hearts, Australia, 2016

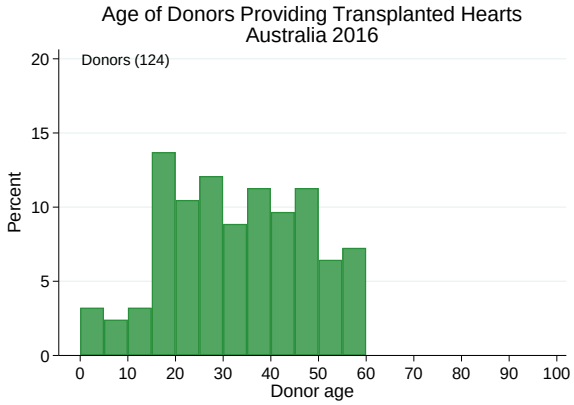
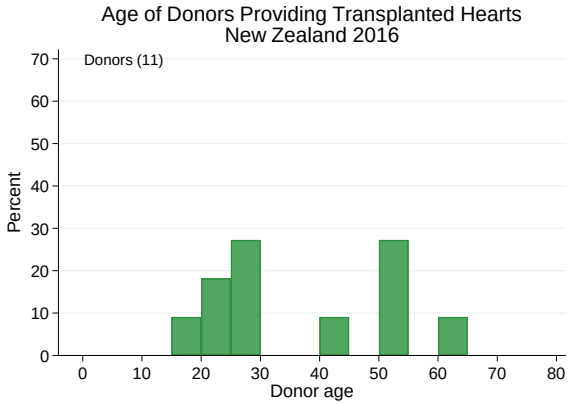


Figure 7.7 Age of Donors Providing Transplant Hearts, New Zealand, 2016



Donor Heart Function

In Australia, 97 (78%) donors with hearts retrieved had a normal ECG and 108 (86.4%) had a normal echocardiogram, prior to heart donation. In New Zealand, 10 out of the 11 heart donors had a normal ECG and normal echocardiogram.

Hearts Not Retrieved

In 2016, there were 245 hearts not retrieved from Australian donors and 39 not retrieved from New Zealand donors.

For Australia, the main reason was due to the heart not being medically suitable (96), followed by no suitable recipient for the heart (64). In New Zealand, there were 18 non-retrieved hearts due to not being medically suitable and 2 due to donation after cardiac death.

Table 7.1 Reasons for Heart Not Retrieved in 2016		
Reason	**Australia**	**New Zealand**
Logistics	7	0
Not Medically Suitable	96	18
Surgically Unsuitable	0	0
Trauma to Organ	2	0
No Suitable Recipients	64	13
Age of Donor	47	6
DCD Donor	13	2
Consent Withdrawn	11	0
Others	5	0
Total	245	39

Hearts Retrieved and Not utilised

Table 7.3 tabulates the reasons Hearts were not used after retrieval for the purpose of transplantation since 2012.

Table 7.2 Reasons Heart Retrieved and Not Utilised for Organ Transplantation in Australia (New Zealand), 2012 - 2016						
	Logistics	**Not Medically Suitable**	**Not Surgically Suitable**	**No Suitable Recipients**	**Other**	**Total**
2012	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
2013	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)	1 (0)
2014	0 (0)	2 (0)	0 (0)	0 (0)	0 (0)	2 (0)
2015	1 (0)	4 (0)	0 (0)	1 (0)	1 (0)	7 (0)
2016	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

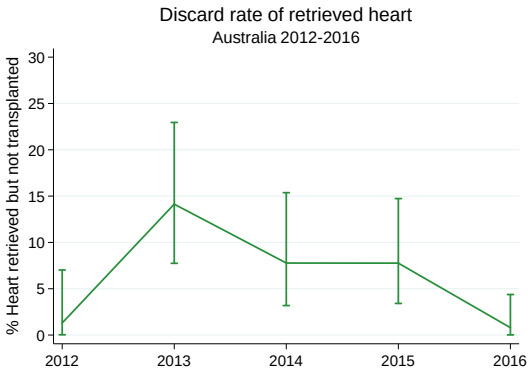
Figures 7.8 and 7.9 show the non-utilisation rate of retrieved hearts - the proportion of Hearts that were retrieved for the purpose of solid organ transplantation, but not ultimately transplanted into a recipient (either due to absence of suitable recipients, or the Heart being found to be medically or surgically unsuitable after retrieval).

In Australia, the non-utilisation rate of Hearts has decreased from 0.5% in 2011 to 7.9% in 2014. In 2015, this fell to just under 6.5%.

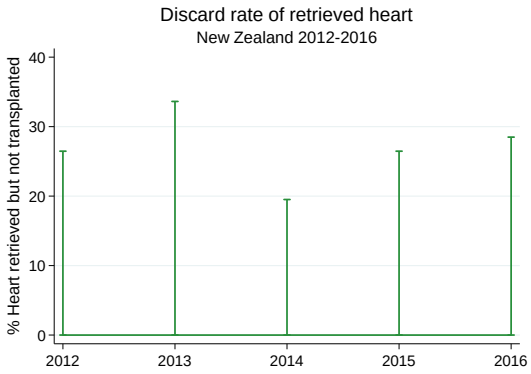
In new Zealand, all hearts retrieved for transplantation have been successfully transplanted.

Figure 7.8 Non-Utilisation Rate of Retrieved Hearts, ***Figure 7.9 Non-Utilisation Rate of Retrieved Hearts,***

Australia, 2012-2016



New Zealand, 2012-2016



Outcome of Heart Donation

The outcome of heart donation activity in Australia and New Zealand throughout the donation pathway is shown in tables 7.3 and 7.4 respectively.

Table 7.3 Outcome of Request for Heart Donation in Australia, 2012-2016					
	2012	**2013**	**2014**	**2015**	**2016**
Total Donors	**354**	**391**	**378**	**435**	**503**
No Request for Heart Donation	96	121	99	129	110
Request for Heart Donation	258	270	279	306	393
Consent Not Given	11	13	30	25	23
Consent Given	247	257	249	281	370
Heart Not Retrieved	170	165	159	178	245
Heart Retrieved	77	92	90	103	125
Heart not used	0	1	2	7	0
Heart used for Research	1	12	5	1	1
Total Heart Transplanted	**76**	**79**	**83**	**95**	**124**
Recipients Transplanted	76	79	83	95	124
(Heart/Lung Transplanted)	4	2	4	2	7
Heart Discard Rate	1.30%	14.13%	7.78%	7.77%	0.80%
Heart Utilised Rate	**98.70%**	**85.87%**	**92.22%**	**92.23%**	**99.20%**

Table 7.4 Outcome of Request for Heart Donation in New Zealand, 2012-2016					
	2012	**2013**	**2014**	**2015**	**2016**
Total Donors	**38**	**36**	**46**	**53**	**61**
No Request for Heart Donation	8	16	17	13	11
Request for Heart Donation	30	20	29	40	50
Consent Not Given	2	1	2	1	0
Consent Given	28	19	27	39	50
Heart Not Retrieved	16	10	10	27	39
Heart Retrieved	12	9	17	12	11
Heart not used	0	0	0	0	0
Heart used for Research	0	0	0	0	0
Total Heart Transplanted	**12**	**9**	**17**	**12**	**11**
Recipients Transplanted	12	9	17	12	11
(Heart/Lung Transplanted)	0	0	1	0	0
Heart Discard Rate	0%	0%	0%	0%	0%
Heart Utilised Rate	**100%**	**100%**	**100%**	**100%**	**100%**

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 7: Deceased Donor Heart Donation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at www.anzdata.org.au

SECTION 8

Deceased Donor Lung Donation

SUMMARY

This section summarises deceased donor lung donation activity from deceased donors in 2016, compared with previous years.

Contents

Table of Figures

Counting Methodology

A transplanted organ is a solid organ retrieved from a deceased donor and transplanted into a recipient. Each organ is counted individually, regardless of the type of transplantation performed. For reporting purposes, two lungs retrieved from a single donor and later transplanted, are counted as 2 organs transplanted.

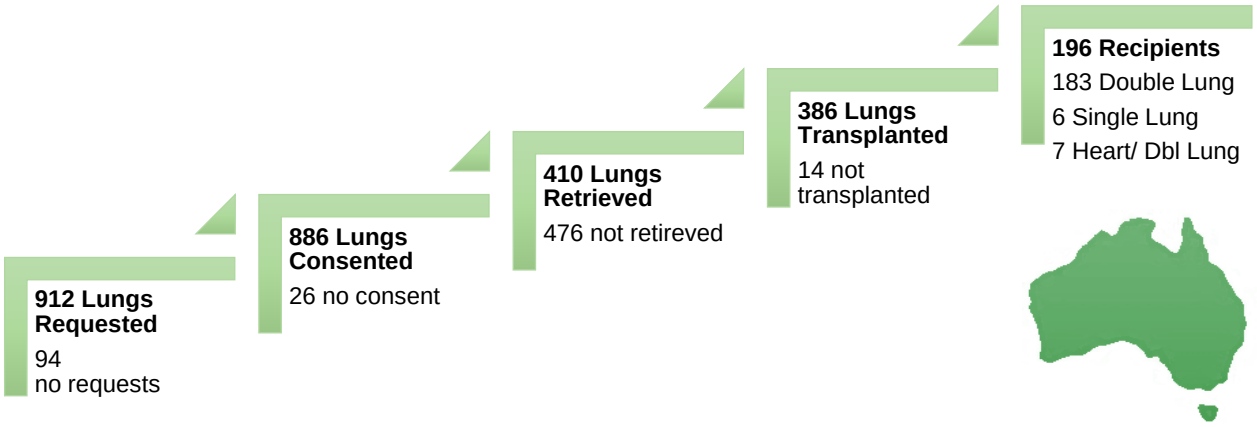
An organ transplantation procedure is the transplantation of one or more solid organ(s) from a deceased donor to a recipient, by organ type. In accordance with this definition, a single lung transplantation procedure or a double lung transplantation procedure, each contribute a count of one. In addition, any simultaneous organ transplant with another organ type is counted as one transplant procedure.

Lung Donation

Of the 503 deceased organ donors in 2016 in Australia, 912 lungs were requested for donation. Of these, 410 lungs were retrieved with 386 lungs transplanted. There were 196 lung transplant recipients (8.1 pmp) an increase of 1.6%. Of these 196 lung transplant recipients, seven received heart/double lung transplants and six received a single lung at transplantation.

Figures 8.1 and 8.2 show the outcomes of requests for Lung donation in Australia and New Zealand for 2016 respectively.

Figure 8.1 Outcomes of Request for Lung Donation from Actual Donors in Australia 2016



In New Zealand, there donors 110 lungs requested for donation. From these, 40 lungs were retrieved and transplanted as double lungs into 20 recipients in 2016. One double lung recipient also received a combine liver transplant.

Figure 8.2 Outcomes of Request for Lung Donation from Actual Donors in New Zealand 2016

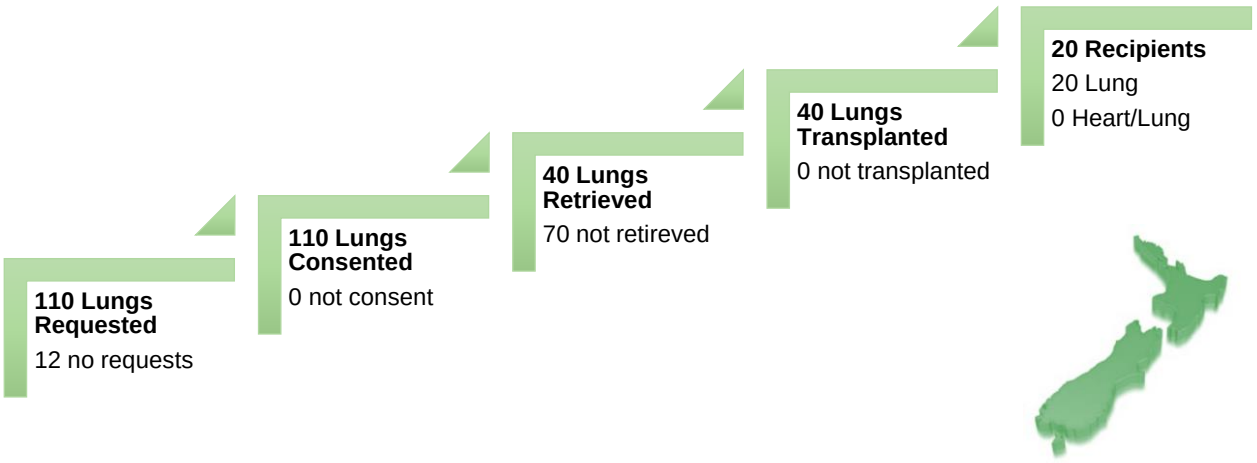


Figure 8.3 to 8.5 show the number of lung transplants by donation pathway and the number of lung recipients by jurisdiction. Figure 8.3 particularly shows an increase in DCD lungs from 2006 to 2016, and DBD lungs from 2010 to 2016 in Australia. There were no lungs donated form DCD donors in New Zealand in 2016 (Figure 8.4)

Figure 8.3 Lungs Transplanted by Donation Pathway - Australia, 1998 - 2016

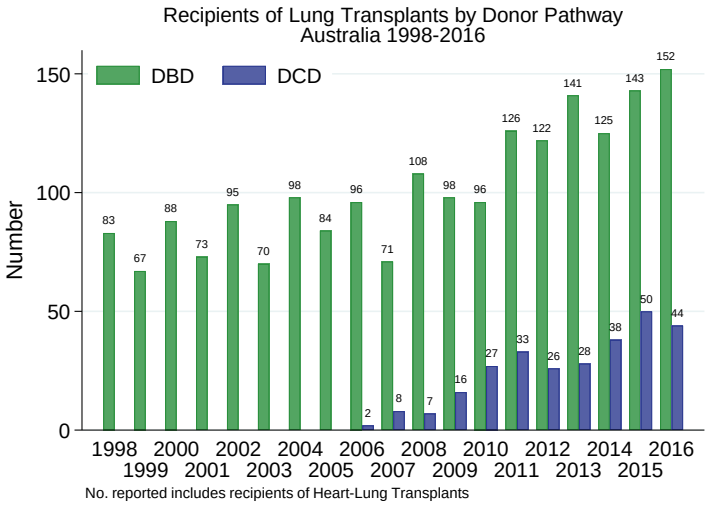


Figure 8.4 Lungs Transplanted by Donation Pathway - New Zealand, 1998 - 2016

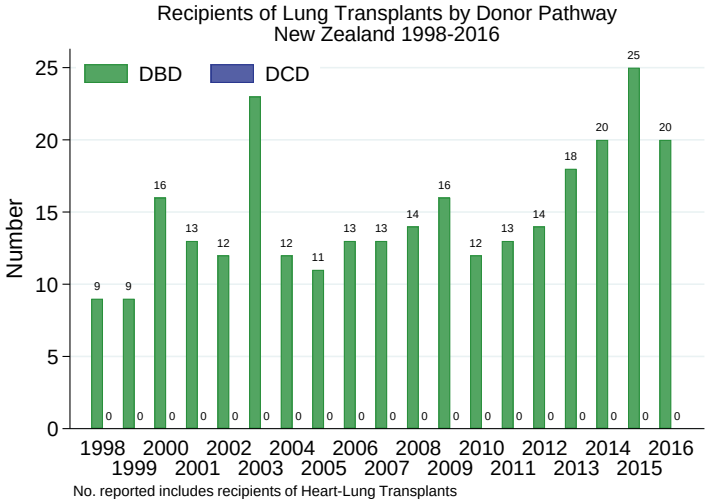
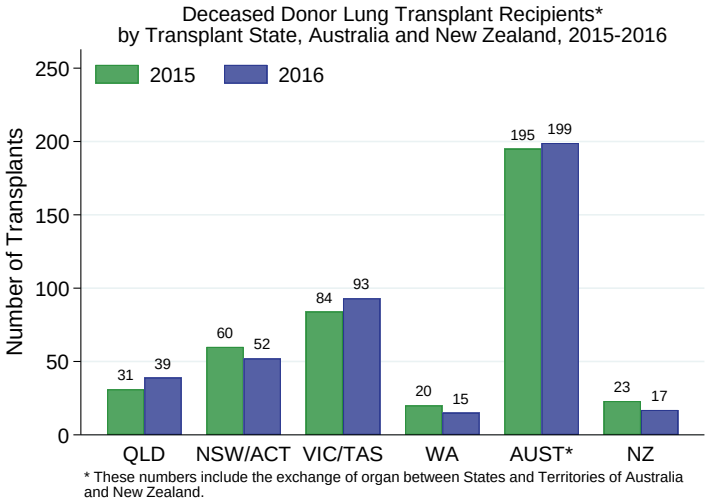


Figure 8.5 Deceased Donor Lung Transplant Recipients by State, Australia & New Zealand, 2015 vs 2016



Age of Lung Donors

The age distribution of donors providing transplanted lungs for Australia and New Zealand is shown in Figures 8.6 and 8.7 respectively.

Figure 8.6 Age of Donors Providing Transplant Lungs, Australia, 2016

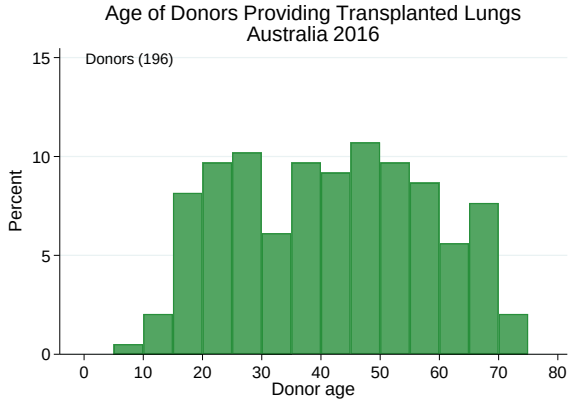
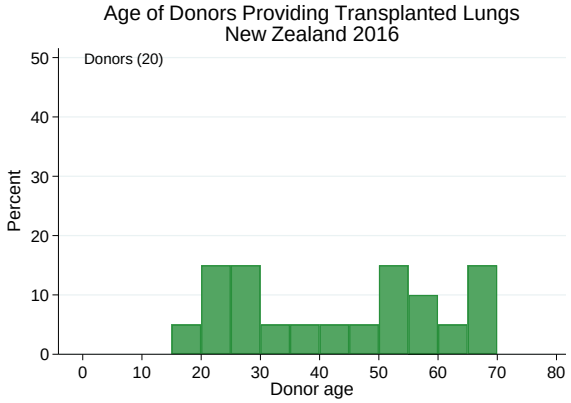


Figure 8.7 Age of Donors Providing Transplant Lungs, New Zealand, 2016



Donor Lung Function

In Australia, 162 (78.6%) donors with lungs retrieved had a bronchoscopy in 2016. Four donors had chest trauma; these included bruising, penetration and rib fractures.

The arterial blood gases were taken on 100% FiO_2 and PEP 5cm of 470 donors. Fifty-three had a PEEP greater than 5cm.

The results from donors of 480 lungs show 20.1 % to be acidotic (pH <7.35) and 16.9 % to be alkalotic (pH>7.45).

Oxygenation measured as PaO_2 ranged from 26 to 610 mmHg with a median of 341.5 mmHg. $PaCO_2$ ranged from 22 to 375 with a median of 39.5 mmHg.

In New Zealand, there were three 15%) lung donors who had a bronchoscopy in 2016. No donors had chest trauma.

All 20 lung donors had 100% FiO2; 10 had a PEEP greater than 5cm.

The arterial blood gas results from these lung donors show 38% (8) to be acidotic (pH < 7.35) and three (14.3%) were alkalotic (pH > 7.45).

Oxygenation measured as PaO2 ranged from 219 - 543 mmHg with a median of 414 mmHg. PaCO2 ranged from 29 - 52 mmHg with a median of 417 mmHg.

Lungs Not Retrieved

In 2016, there were 476 Lungs not retrieved from Australian donors and 70 not retrieved from New Zealand donors.

For Australia, the main reason was due to the Lung not being medically suitable (309), followed by no suitable recipient for the lung (107).

In New Zealand, there were 35 non-retrieved Lungs due to not being medically suitable and 4 due to donation after cardiac death.

Table 8.1 Reasons for Lung Not Retrieved in 2016

Reason	Australia	New Zealand
Logistics	20	2
Not Medically Suitable	309	35
Surgically Unsuitable	0	0
Trauma to Organ	12	2
No Suitable Recipients	107	21
Age of Donor	14	4
DCD Donor	0	4
Consent Withdrawn	8	0
Others	6	2
Total	**476**	**70**

Lungs Retrieved and Not utilised

Table 8.3 tabulates the reasons Lungs were not used after retrieval for the purpose of transplantation, since 2012.

Table 8.2 Reasons Lung Retrieved and Not Utilised for Organ Transplantation in Australia (New Zealand), 2012 - 2016

	Logistics	Not Medically Suitable	Not Surgically Suitable	No Suitable Recipients	Other	Total
2012	0 (0)	0 (0)	0 (0)	0 (0)	3 (0)	3 (0)
2013	0 (0)	4 (0)	0 (0)	0 (0)	0 (0)	4 (0)
2014	0 (0)	10 (1)	0 (0)	2 (0)	0 (0)	12 (1)
2015	0 (0)	3 (0)	0 (0)	0 (0)	0 (0)	3 (0)
2016	0 (0)	13 (0)	0 (0)	0 (0)	1 (0)	14 (0)

Figures 8.8 and 8.9 show the non-utilisation rate of retrieved Lungs - the proportion of Lungs that were retrieved for the purpose of solid organ transplantation, but not ultimately transplanted into a recipient (either due to absence of suitable recipients, or the Lung being found to be medically or surgically unsuitable after retrieval).

In Australia, the non-utilisation rate of Lungs has decreased from 0.5% in 2011 to 8.9% in 2014. In 2015, this fell to just under 6.5%.

In new Zealand, all Lungs retrieved for transplantation have been successfully transplanted.

Figure 8.8 Non-Utilisation Rate of Retrieved Lungs, Australia, 2012-2016

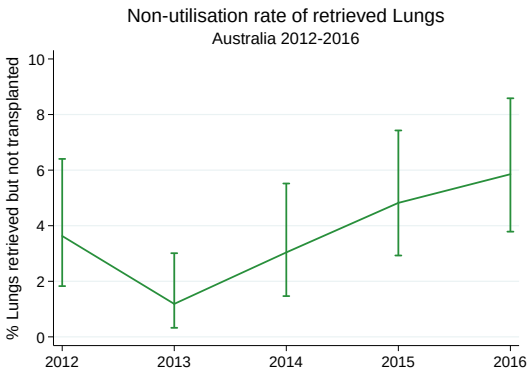
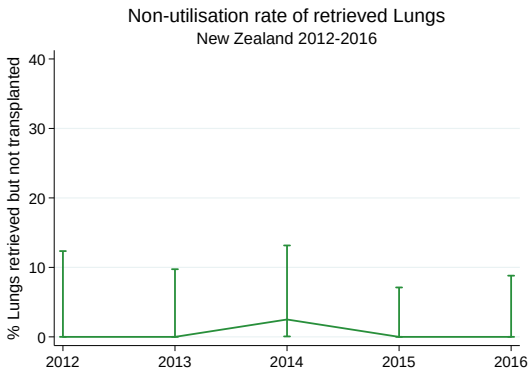


Figure 8.9 Non-Utilisation Rate of Retrieved Lungs, New Zealand, 2012-2016



Outcome of Lung Donation

The outcome of Lung donation activity in Australia and New Zealand throughout the donation pathway is shown in tables 8.3 and 8.4 respectively.

Table 8.3 Outcome of Request for Lung Donation in Australia, 2012-2016

	2012	2013	2014	2015	2016
Total Donors	**354**	**391**	**378**	**435**	**503**
Lungs with No Request for Donation	86	92	72	86	94
Lungs with Request for Donation	622	690	684	784	912
Lungs with Consent Not Given for Donation	12	30	24	32	26
Lungs with Consent Given for Donation	610	660	660	752	886
Lung Not Retrieved	307	323	331	358	476
Lung Retrieved	303	337	329	394	410
(Single Lung Retrieved)	1	1	3	2	2
(Double Lung Retrieved)	151	168	163	196	204
Total Lungs Not Used	3	4	10	3	14
Lungs used for Research	8	0	0	16	10
Lungs Transplanted	**292**	**333**	**319**	**375**	**386**
Recipient Transplanted	**148**	**169**	**163**	**193**	**196**
Double Lung Recipient	144	164	156	182	190
Single Lung(L) Recipients	2	3	4	6	5
Single Lung(R) Recipients	2	2	3	5	1
(Heart/Lung Recipients)	4	2	4	2	7
Lung Non-Utilisation Rate	3.63%	1.19%	3.04%	4.82%	5.85%
Lung Utilised Rate	**96.37%**	**98.81%**	**96.96%**	**95.18%**	**94.15%**

Table 8.4 Outcome of Request for Lung Donation in New Zealand, 2012-2016

	2012	2013	2014	2015	2016
Total Donors	**38**	**36**	**46**	**53**	**61**
Lungs with No Request for Donation	10	18	26	14	12
Lungs with Request for Donation	66	54	66	92	110
Lungs with Consent Not Given for Donation	4	0	0	0	0
Lungs with Consent Given for Donation	62	54	66	92	110
Lung Not Retrieved	34	18	26	42	70
Lung Retrieved	28	36	40	50	40
(Single Lung Retrieved)	0	0	0	0	0
(Double Lung Retrieved)	14	18	20	25	20
Total Lungs Not Used	0	0	1	0	0
Lungs used for Research	0	0	0	0	0
Lungs Transplanted	**28**	**36**	**39**	**50**	**40**
Recipient Transplanted	**14**	**18**	**20**	**25**	**20**
Double Lung Recipient	14	18	19	25	20
Single Lung(L) Recipients	0	0	1	0	0
Single Lung(R) Recipients	0	0	0	0	0
(Heart/Lung Recipients)	0	0	1	0	0
Lung Non-Utilisation Rate	0%	0%	2.50%	0%	0%
Lung Utilised Rate	**100%**	**100%**	**97.50%**	**100%**	**100%**

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 8: Deceased Donor Lung Donation. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2018. Available at www.anzdata.org.au

SECTION 9

Deceased Donor Pancreas Donation

SUMMARY

This section summarises pancreas donation activity from deceased donor in 2016, compared with previous years. Both countries reached their highest rate of pancreas transplanted in 2016, with 2.2 pmp in Australia and 0.9 pmp in New Zealand.

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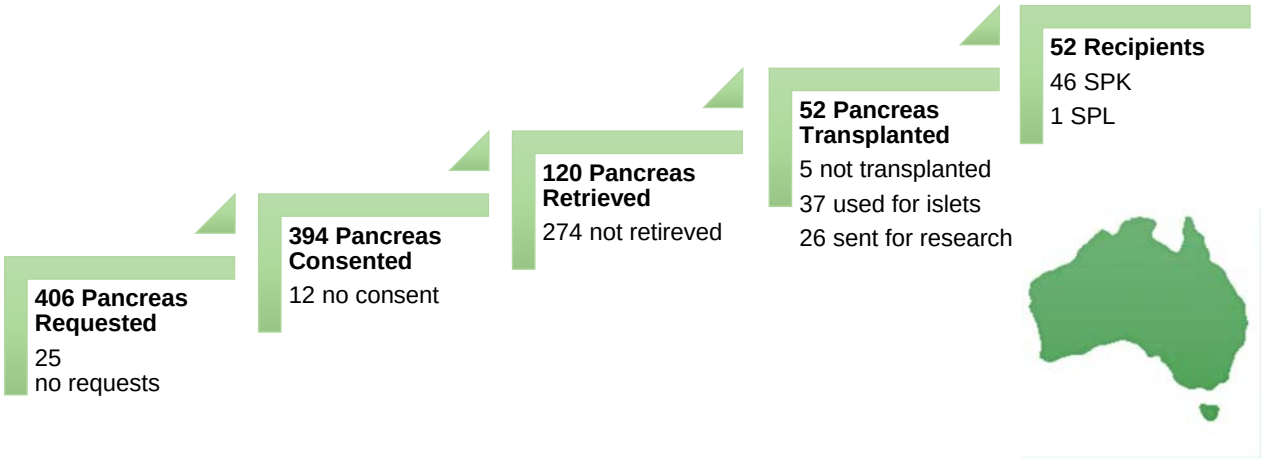
Table of Figures

Pancreas Donation

In Australia there were 52 pancreas transplants in 2016, a 15.6% increase in the total number of pancreas transplants compared to 45 in 2015. Forty-seven pancreases were transplanted simultaneously with another organ resulting in 46 simultaneous pancreas/kidney transplant recipients and one pancreas/liver transplant recipient. There was an overall increase of 15.6% in the total number of pancreas transplants; an increase to 2.2 per million population (pmp).

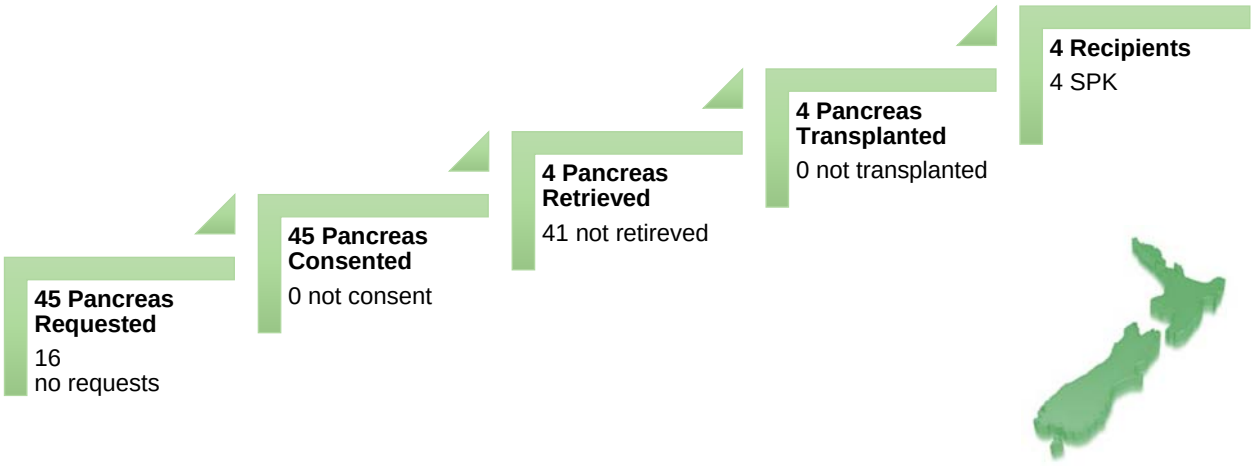
Figure 9.1 Outcomes of Request for Pancreas Donation from Actual Donors in Australia 2016



In New Zealand, there were four pancreas transplants in 2016. All four transplants were a combined pancreas/kidney transplant.

There was an overall increase of one in the total number of pancreas transplant recipients (4) in 2016 compared to the previous year (3). Figures 9.2 shows the outcomes of requests for pancreas donation, in New Zealand.

Figure 9.2 Outcomes of Request for Pancreas Donation from Actual Donors in New Zealand 2016



SPK = Simultaneous Pancreas Kidney transplant
SPL= Simultaneous Pancreas Liver transplant

Figure 9.3 to 9.5 show the number of pancreas transplants by donation pathway and the number of pancreas recipients by jurisdiction. Figure 9.3 particularly shows an increase in DCD pancreas from 2006 to 2016, and DBD pancreas from 2012 to 2016 in Australia.

Figure 9.3 Pancreas Transplanted by Donation Pathway - Australia,

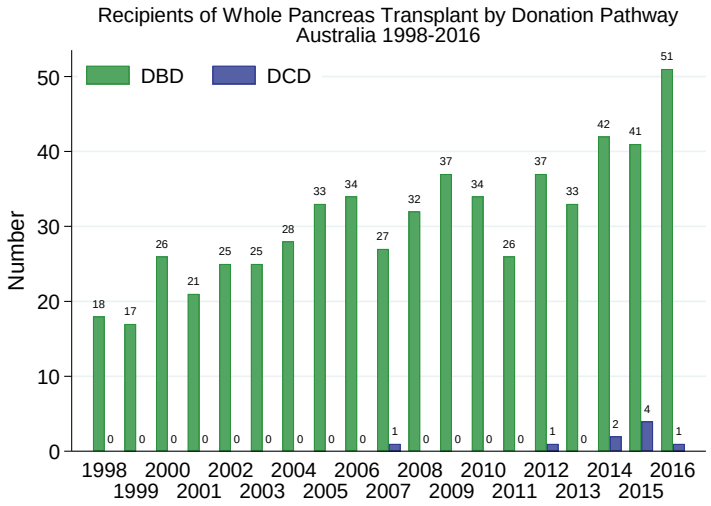


Figure 9.4 Pancreas Transplanted by Donation Pathway - New Zealand,

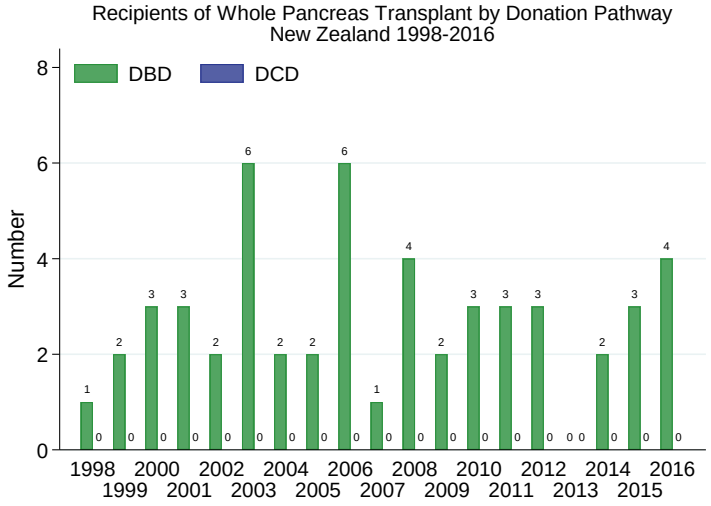
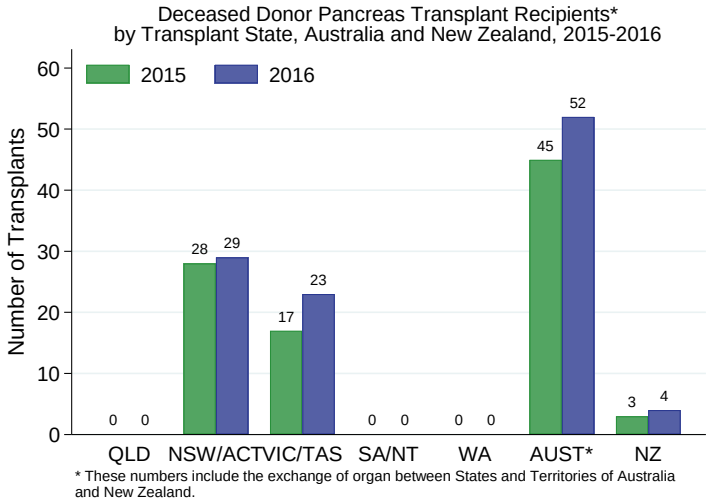


Figure 9.5 Deceased Donor Pancreas Transplant Recipients by State, Australia & New Zealand, 2015 vs 2016



Age of Pancreas Donors

The age distribution of donors providing transplanted pancreas for Australia and New Zealand is shown in Figures 9.6 and 9.7 respectively.

Figure 9.6 **Age of Donors Providing Transplant Pancreas, Australia, 2016**

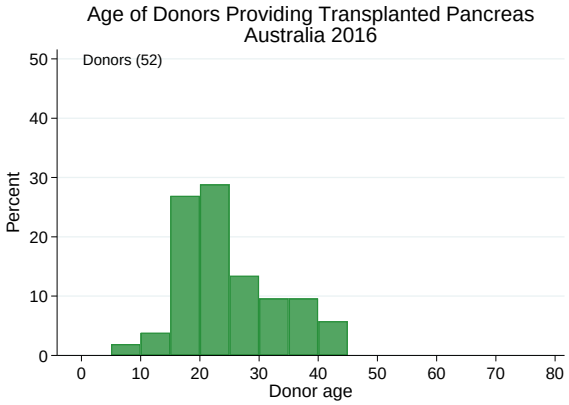
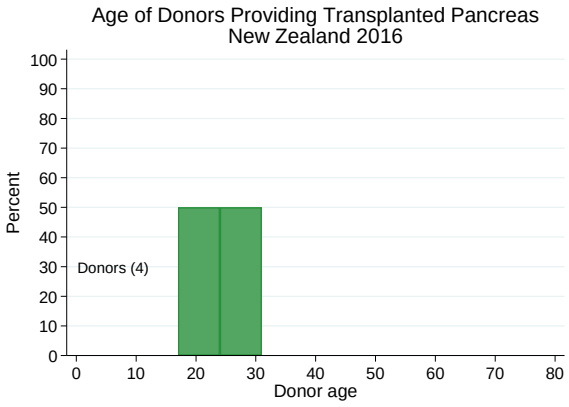


Figure 9.7 **Age of Donors Providing Transplant Pancreas, New Zealand, 2016**



Donor Pancreas Function

Tests for pancreas function of deceased donors include blood sugar levels, serum amylase and serum lipase tests. There were 81.5% of donors in Australia and 40% of donors in New Zealand, who had blood sugar levels greater than 8mmol/L. Eighty-seven percent of donors in Australia and 75% in New Zealand, in 2016, had normal amylase levels or lipase less than 80 U/L.

Pancreas Not Retrieved

In 2016, there were 274 pancreas not retrieved from Australian donors and 41 not retrieved from New Zealand donors.

For Australia, the main reason was due to the pancreas not being medically suitable (115), followed age of donor (58). In New Zealand, there were 21 non-retrieved pancreas due to age of donor and nine due to not being medically suitable.

Table 9.2 Reasons for Pancreas Not Retrieved in 2016

Reason	Australia	New Zealand
Logistics	27	0
Not Medically Suitable	115	9
Surgically Unsuitable	11	0
Trauma to Organ	7	5
No Suitable Recipients	43	3
Age of Donor	58	21
DCD Donor	11	2
Consent Withdrawn	1	0
Others	1	1
Total	**274**	**41**

Pancreas Retrieved and Not utilised

The reasons why pancreas were not utilised for organ transplantation is presented in Table 9.2.

Table 9.3 Reasons Pancreas Retrieved & Not Utilised for Transplantation, Australia (New Zealand) 2012 - 2016

Year	Logistics	Not Medically Suitable	Not Surgically Suitable	Trauma to Organ	No Suitable Recipients	Research	Islets	Other	Total
2012	2 (0)	0 (0)	0 (0)	0 (0)	0 (0)	19 (0)	7 (0)	0 (0)	28 (0)
2013	0 (0)	1 (0)	0 (0)	1 (0)	0 (0)	26 (0)	6 (0)	0 (0)	34 (0)
2014	0 (0)	2 (0)	1 (0)	0 (0)	0 (0)	38 (0)	6 (0)	0 (0)	47 (0)
2015	1 (0)	4 (0)	1 (0)	0 (0)	0 (0)	42 (0)	12 (0)	0 (0)	60 (0)
2016	**1 (0)**	**2 (0)**	**2 (0)**	**0 (0)**	**0 (0)**	**48 (0)**	**7 (0)**	**0 (0)**	**60 (0)**

Figures 9.8 and 9.9 show the non-utilisation rate of retrieved pancreas – the proportion of pancreas that were retrieved for the purpose of solid organ transplantation, but not ultimately transplanted into a recipient (either due to an absence of suitable recipients, or the pancreas being found to be medically or surgically unsuitable after retrieval).

Figure 9.8 Non-Utilisation Rate of Retrieved Pancreas, Australia, 2012-2016

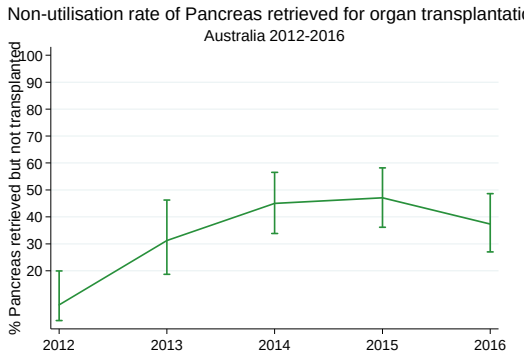
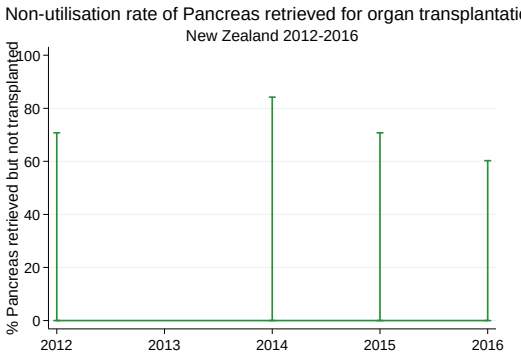


Figure 9.9 Non-Utilisation Rate of Retrieved Pancreas, New Zealand, 2012-2016



Outcome of Pancreas Donation

The outcome of pancreas donation activity in Australia and New Zealand throughout the donation pathway is shown in table 9.4

Table 9.4 Outcome of Request for Pancreas Donation in Australia 2012 - 2016					
Outcome of Request	**2012**	**2013**	**2014**	**2015**	**2016**
Total Donors	354	391	378	435	503
No Request for Pancreas Donation	88	92	77	107	97
Request for Pancreas Donation	266	299	301	328	406
Consent Not Given	8	10	16	14	12
Consent Given	258	289	285	314	394
Pancreas Not Retrieved	**188**	**221**	**184**	**193**	**274**
Pancreas Retrieved	70	68	101	121	120
Pancreas Not Used	28	34	47	60	60
Whole Pancreas Transplanted	38	33	44	45	52
Pancreas Only Transplanted	**0**	**0**	**0**	**2**	**5**
Pancreas Transplanted with Other Organ	38	33	44	43	47
Pancreas Islets Transplanted	4	1	10	16	8
Whole Pancreas Recipients	**38**	**33**	**44**	**45**	**52**
Pancreas Only Recipients	0	0	0	2	5
Pancreas with Other Organ Recipients	38	33	44	43	47
Pancreas Islets Recipients	3	1	10	15	8
Pancreas (including Islets) Non-utilisation Rate	40%	50%	46.53%	49.59%	50%
Pancreas (Whole, no Islets) Utilised Rate	**54.29%**	**48.53%**	**43.56%**	**37.19%**	**43.33%**

Table 9.5 Outcome of Request for Pancreas Donation in New Zealand 2012 - 2016					
Outcome of Request	**2012**	**2013**	**2014**	**2015**	**2016**
Total Donors	**38**	**36**	**46**	**53**	**61**
No Request for Pancreas Donation	16	23	24	14	16
Request for Pancreas Donation	22	12	22	39	45
Consent Not Given	0	0	0	1	0
Consent Given	22	12	22	38	45
Pancreas Not Retrieved	19	12	20	35	41
Pancreas Retrieved	**3**	**0**	**2**	**3**	**4**
Pancreas Not Used	0	0	0	0	0
Whole Pancreas Transplanted	**3**	**0**	**2**	**3**	**4**
Pancreas Transplanted with Other Organ	3	0	2	3	4
Pancreas Islets Transplanted	0	0	0	0	0
Whole Pancreas Recipients	**3**	**0**	**2**	**3**	**4**
Pancreas with Other Organ Recipients	**3**	**0**	**2**	**3**	**4**
Pancreas (Whole, no Islets) Utilised Rate	**100%**	**0%**	**100%**	**100%**	**100%**

Suggested Citation:

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SECTION 11

Eye and Tissue Donation and Outcome Data

SUMMARY

This chapter summarises the data on tissue and eye donation and transplant outcome. The data presented here is provided by Tissue and Eye Banks across Australia, in conjunction with data collected within the solid organ donation sector, DonateLife.

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Eye and Tissue Reporting

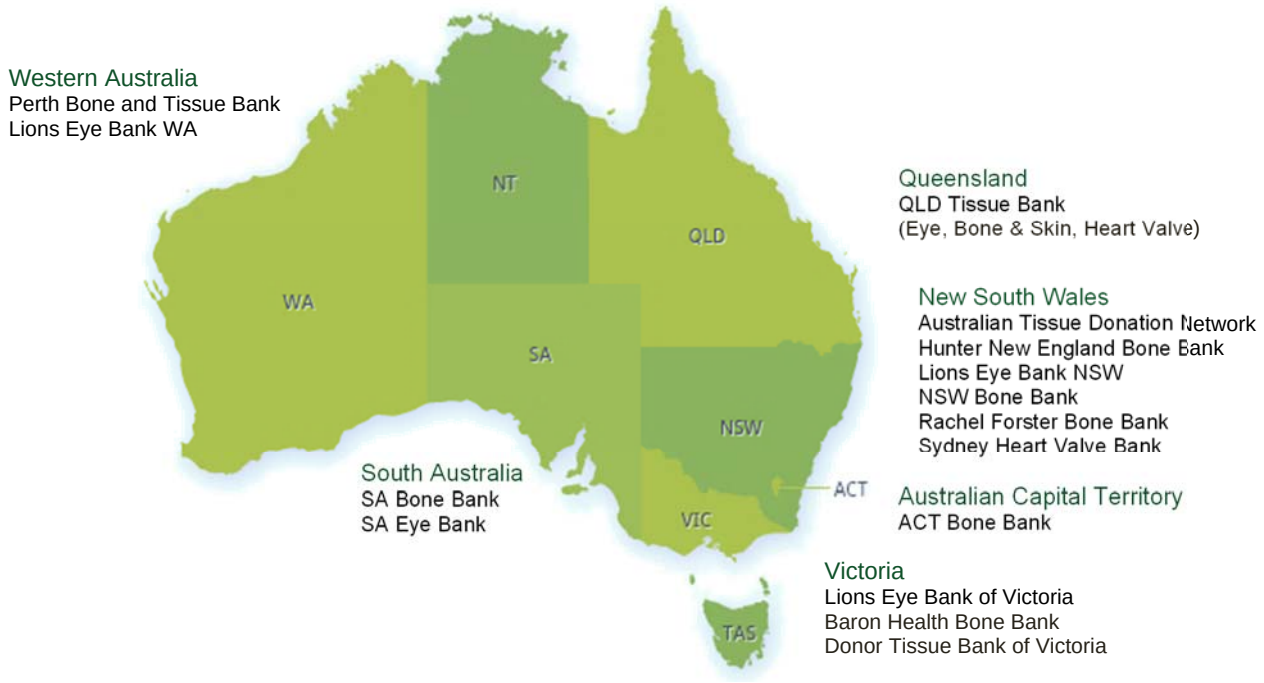
The collaboration between the Australian Organ and Tissue Authority (OTA), jurisdictional tissue and eye banks and the ANZOD Registry continues to strengthen the national reporting of tissue data. Reported datasets and analyses produced by the Registry inform the discussions held by health care professionals, policy makers, consumers and individual agencies to optimise every potential donation opportunity and to increase access to life-transforming transplantation for Australians - See more at:

http://www.donatelife.gov.au/organ-and-tissue-authority-ota

Tissue and Eye Banks

Tissue and Eye banks across Australia provide data for cardiovascular, musculoskeletal and skin tissue donations.

Figure 11.1 Eye and Tissue Bank Location across Australia



Musculoskeletal donations can be in the form of bone, tendon and ligaments and are utilised for knee and hip replacements, reconstructive orthopaedic surgery following trauma or disease and spinal deformities and can aid in prevention of limb loss following tumour removal. Just one musculoskeletal donation can aid many recipients and greatly improve their quality of life.

Cardiovascular tissue incorporates donations of heart valves, pericardium and thoracic aorta. Heart valves are necessary to regulate the flow of blood to and from the heart, whereas pericardium can be used during neurosurgery or, like the thoracic aorta, can also be used for vascular repair of defects or injury.

Donated skin contributes to saving lives and improving long term outcomes for patients who suffer severe burns. Donated skin is essential when a patient's own skin cannot be used for grafting. Using donated skin as a wound "dressing" helps reduce infection, fluid loss and pain, promotes wound healing and minimises scarring. Often recipients will require more than one donated graft for their wounds to heal. Skin grafts are also used to treat wounds resulting from trauma and serious infection.

Eye banks in Australia provide data for eye donation including corneal and sclera tissue donations.

Tissue Donors

In 2016, there was 4,292 tissue donors in Australia. Of these donors, 3,868 (90%) living donors and 424 (10%) deceased donors, provided 4,573 tissue donations for transplantation. Each total number excludes duplicate counts of donors who were also multi-organ and tissue donors or multi-tissue donors.

Figure 11.2 shows the number of tissue donors across each jurisdiction from 2015 to 2016. Five tissue banks in NSW accounted for 45% (1,738) of living tissue donors.

Figure 11.2 Number of Tissue Donors by Jurisdiction, 2015-16

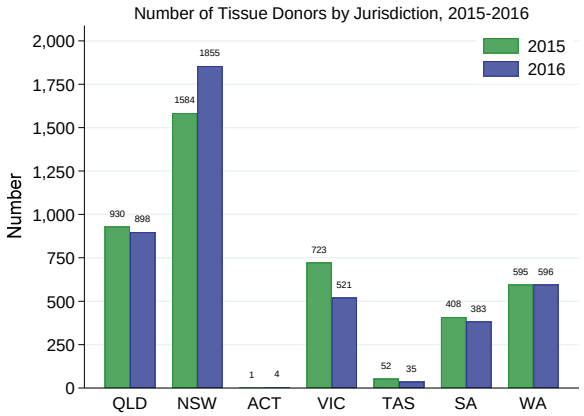


Table 11.1 summarises the number of tissue donors, by donation pathway, by jurisdiction and the percentage change in donor numbers from 2015 to 2016.

Table 11.1 Number of Tissue Donors by Donation Pathway by Jurisdiction 2015-2016

Donation Type	Jurisdiction	2015	2016	Percent change
Living Donor	QLD	794 (20.2%)	731 (18.9%)	-8%
	NSW	1490 (37.9%)	1738 (44.9%)	17%
	ACT	0 (0%)	0 (0%)	0%
	VIC	620 (15.8%)	407 (10.5%)	-34%
	TAS	49 (1.2%)	33 (.9%)	-33%
	SA	396 (10.1%)	376 (9.7%)	-5%
	NT	0 (0%)	0 (0%)	0%
	WA	579 (14.7%)	583 (15.1%)	1%
	AUS	**3928 (100%)**	**3868 (100%)**	**-2%**
Deceased Donor	QLD	136 (37.3%)	167 (39.4%)	23%
	NSW	94 (25.8%)	117 (27.6%)	24%
	ACT	1 (.3%)	4 (.9%)	300%
	VIC	103 (28.2%)	114 (26.9%)	11%
	TAS	3 (.8%)	2 (.5%)	-33%
	SA	12 (3.3%)	7 (1.7%)	-42%
	NT	0 (0%)	0 (0%)	0%
	WA	16 (4.4%)	13 (3.1%)	-19%
	AUS	**365 (100%)**	**424 (100%)**	**16%**
Total Donors	QLD	930 (21.7%)	898 (20.9%)	-3%
	NSW	1584 (36.9%)	1855 (43.2%)	17%
	ACT	1 (0%)	4 (.1%)	300%
	VIC	723 (16.8%)	521 (12.1%)	-28%
	TAS	52 (1.2%)	35 (.8%)	-33%
	SA	408 (9.5%)	383 (8.9%)	-6%
	NT	0 (0%)	0 (0%)	0%
	WA	595 (13.9%)	596 (13.9%)	0%
	AUS	**4293 (100%)**	**4292 (100%)**	**0%**

Figures 11.3 to 11.5 show the breakdown of Tissue Donors numbers donation pathway and jurisdiction for 2016 compared to 2015. Nationally there was a decrease in living tissue donor numbers by 2% in 2016 and increase 16% in the total number of deceased tissue donors.

Figure 11.3 Living Tissue Donors by Jurisdiction, 2015-2016

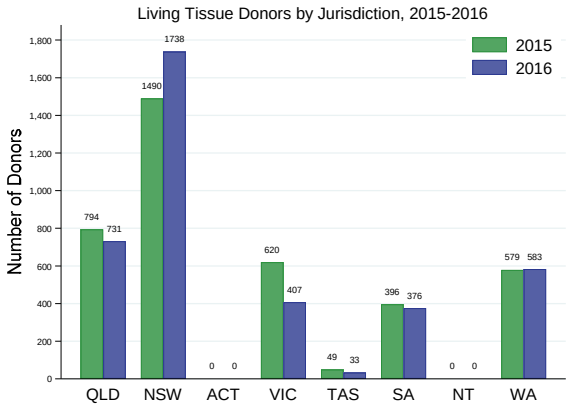
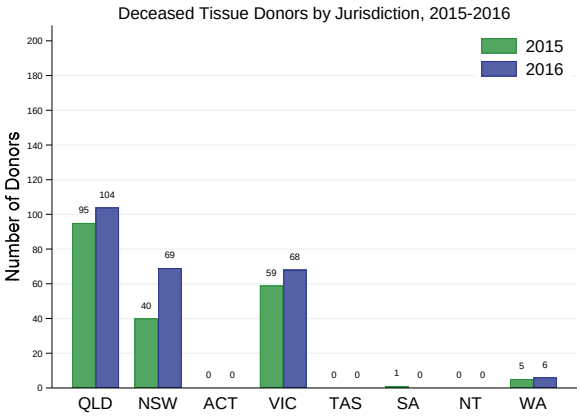
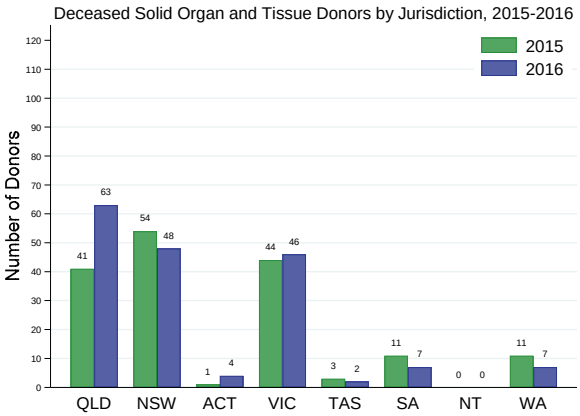


Figure 11.4 Deceased Tissue Donors by Jurisdiction, 2015-2016



In 2016, 177 (41.7%) deceased tissue donors were reported through the solid organ and tissue donation sector. These donors were referred by the DonateLife Network. Figure 11.5 provides the breakdown by jurisdiction in tissue donations from deceased solid organ and tissue donors for 2015 and 2016.

Figure 11.5 Deceased Solid Organ and Tissue Donors by Jurisdiction, 2015-2016



Tissue Donation

The 4,292 tissue donors in Australia during 2016, accounted for 4,573 tissue donations (Figure 11.6). There was an overall increase of 13.8% in 2016, in the total number (650) of tissue donations from deceased donors compared to 2015 (571). Of these 650 tissue donations, 376 (57.8%) came from tissue only donors.

Figure 11.6 Total Tissue Donation by Jurisdiction, 2015-2016

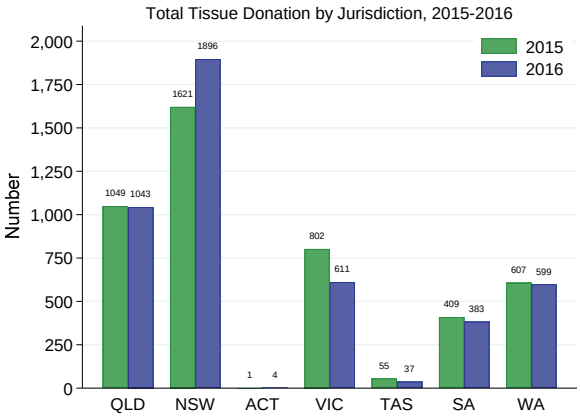


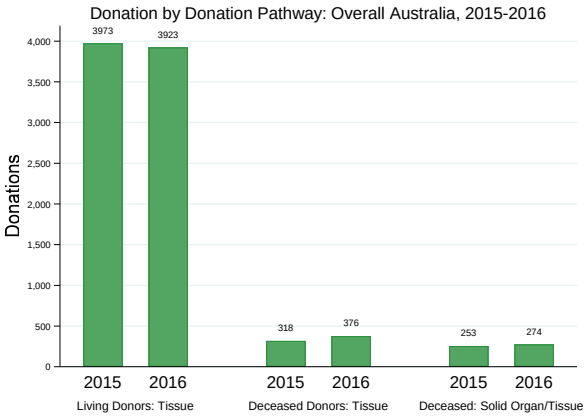
Table 11.2 shows the total number and proportion, by donation pathway, by jurisdiction and the percentage change in tissue donation from 2015 to 2016.

Table 11.2 Number of Tissue Donations by Donor Type by Jurisdiction 2015-2016

Donation Type	Jurisdiction	2015	2016	Percent Change
Living donor donations	QLD	808 (20.3%)	746 (19%)	-8%
	NSW	1509 (38%)	1772 (45.2%)	17%
	ACT	0 (0%)	0 (0%)	0%
	VIC	620 (15.6%)	408 (10.4%)	-34%
	TAS	51 (1.3%)	35 (.9%)	-31%
	SA	396 (10%)	376 (9.6%)	-5%
	WA	589 (14.8%)	586 (14.9%)	-1%
	AUS	**3973 (100%)**	**3923 (100%)**	**-1%**
Deceased donor donations	QLD	241 (42.2%)	297 (45.7%)	23%
	NSW	112 (19.6%)	124 (19.1%)	11%
	ACT	1 (.2%)	4 (.6%)	300%
	VIC	182 (31.9%)	203 (31.2%)	12%
	TAS	4 (.7%)	2 (.3%)	-50%
	SA	13 (2.3%)	7 (1.1%)	-46%
	WA	18 (3.2%)	13 (2%)	-28%
	AUS	**571 (100%)**	**650 (100%)**	**14%**
Total donations	QLD	1049 (23.1%)	1043 (22.8%)	-1%
	NSW	1621 (35.7%)	1896 (41.5%)	17%
	ACT	1 (0%)	4 (.1%)	300%
	VIC	802 (17.6%)	611 (13.4%)	-24%
	TAS	55 (1.2%)	37 (.8%)	-33%
	SA	409 (9%)	383 (8.4%)	-6%
	WA	607 (13.4%)	599 (13.1%)	-1%
	AUS	**4544 (100%)**	**4573 (100%)**	**1%**

Of these 4,573 donations of musculoskeletal, cardiovascular, skin and pancreas islet tissue, 3,923 (85.8%) were from live donors and 650 (14.2%) were tissue donations from deceased donors.

Figure 11.7 Donation by Donation Pathway: Overall Australia, 2015-2016



Among the 3,923 living tissue donations in Australia during 2016, NSW recorded an increase in donation numbers compared to 2015, reporting 45.2% (1,772) of living tissue donations (Figure 11.8).

Figure 11.8 Living Tissue Donation by Jurisdiction, 2015-2016

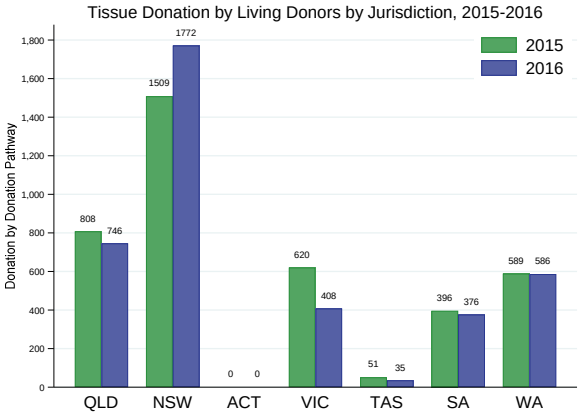


Table 11.3 Shows the breakdown of donation from living donors, by tissue type and donation.

Table 11.3 Tissue Donation from Living Donors in 2016 by State and Donation Sector

State	Musculoskeletal	Cardiovascular	Total
QLD	746	0	746
NSW	1756	16	1772
ACT	0	0	0
VIC	402	6	408
TAS	35	0	35
SA	376	0	376
WA	586	0	586
AUS	**3901**	**22**	**3923**

Of the 650 tissue donations from deceased donors in 2016, 376 (57.8%) came from tissue only donor and 274 (42.2%) were reported through the solid organ and tissue donation sector. These donors were referred by the DonateLife Network. Table 11.3 shows the breakdown of donation from deceased donors, by tissue type and donation sector.

Table 11.4 Tissue Donation from Deceased Donors in 2016, by State and Donation Sector

State	Tissue Only Sector				Solid Organ/Tissue Sector				Tissue Total			
	ms	cv	skin	pi	ms	cv	skin	pi	ms	cv	skin	pi
QLD	63	25	95	0	36	39	38	1	99	64	133	1
NSW	64	5	0	0	24	28	0	3	88	33	0	3
ACT	0	0	0	0	0	4	0	0	0	4	0	0
VIC	38	24	56	0	23	28	32	2	61	52	88	2
TAS	0	0	0	0	0	2	0	0	0	2	0	0
SA	0	0	0	0	0	5	0	2	0	5	0	2
WA	6	0	0	0	7	0	0	0	13	0	0	0
AUS	**171**	**54**	**151**	**0**	**90**	**106**	**70**	**8**	**261**	**160**	**221**	**8**

ms = musculoskeletal tissue | cv = cardiovascular tissue | pi = pancreas islets

Figures 11.9 to 11.10, show the breakdown deceased tissue only and solid organ and tissue donation, by Jurisdiction, for the period 2015 to 2016.

Figure 11.9 Tissue Donation by Deceased Donors by Jurisdiction, 2015-2016

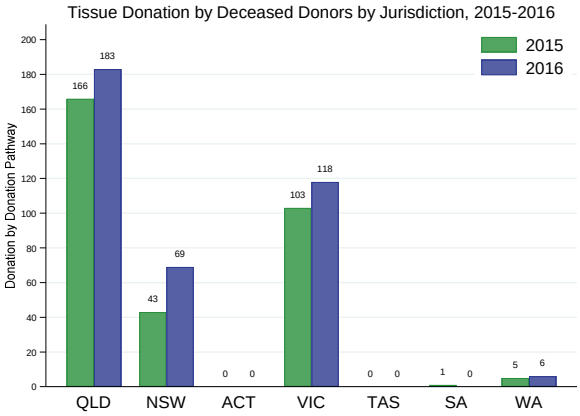
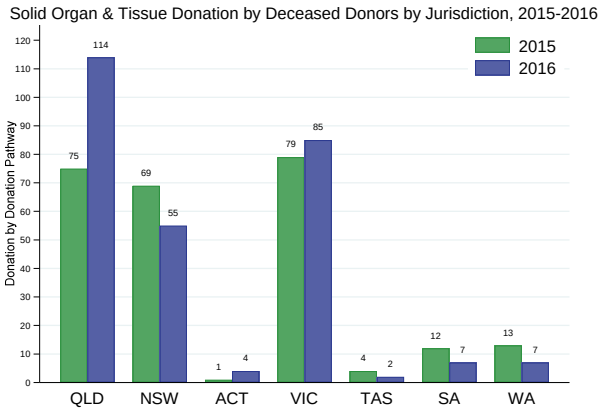


Figure 11.10 Solid Organ and Tissue Donation by Deceased Donors by Jurisdiction, 2015-2016



Type of Tissue Donation

Tissue Donations reported here are by donation pathway for musculoskeletal, cardiovascular, skin and pancreas islet tissue.

Musculoskeletal Donation

In Australia during 2016, there were 3,901 musculoskeletal tissue donations from living donors.

Figures 11.11 and 11.12 show the number of musculoskeletal tissue donations by jurisdiction for 2016 compared with 2015, from Living donors and Deceased donors. Forty five percent (1,756) of musculoskeletal of living donations were reported by the Bone Banks within New South Wales (NSW).

Figure 11.11 Musculoskeletal Donation by Living Donors, by Jurisdiction, 2015-2016

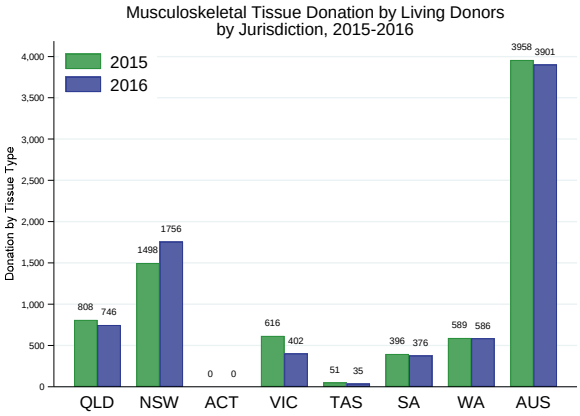
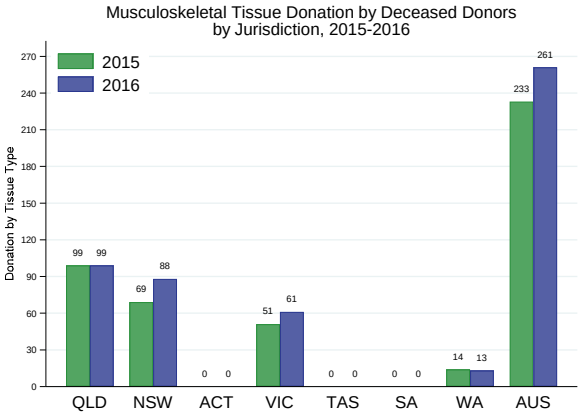


Figure 11.12 Musculoskeletal Tissue Donation from Deceased Donors by Jurisdiction, 2016



Cardiovascular Donation

Figures 11.13 and 11.14 show the breakdown by jurisdiction for cardiovascular tissue donation for the period 2016 compared to 2015. All cardiovascular tissue donations from living donors come from the eastern jurisdictions of Australia (NSW, VIC). Fifty eight percent (106) of cardiovascular donations in 2016 came from the solid organ and tissue deceased donation sector via DonateLife.

Figure 11.13 Cardiovascular Tissue Donation by Living Donors, by Jurisdiction, 2015-2016

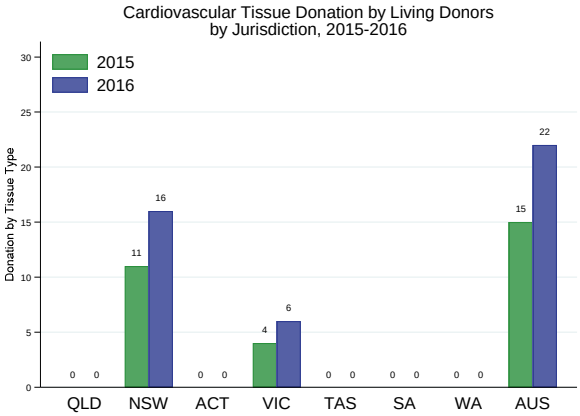
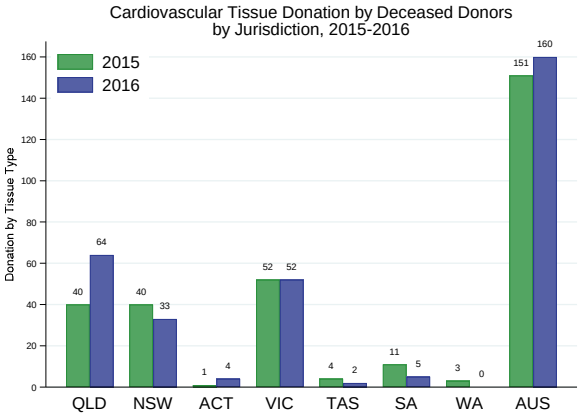


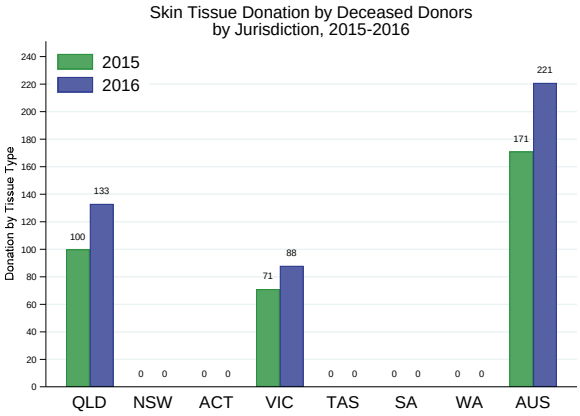
Figure 11.14 Cardiovascular Tissue Donation by Deceased Donors, by Jurisdiction, 2015-2016



Skin Donation

Queensland and Victoria are the only two jurisdictions with skin donation services in Australia. Figure 11.15 shows the breakdown of skin donations between the two jurisdictions for 2016 compared to 2015.

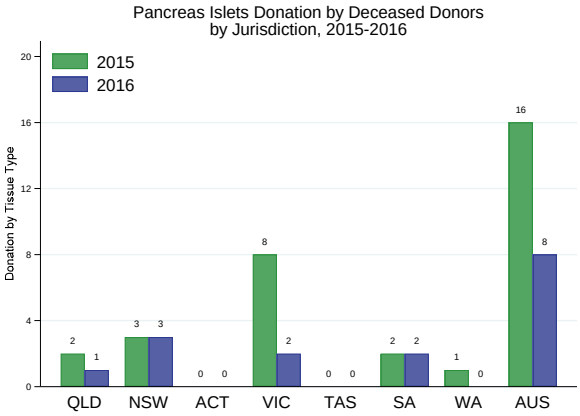
Figure 11.15 Skin Tissue Donation by Deceased Donors, by Jurisdiction, 2015-2016



Pancreas Islets Donation

Pancreas Islets are cells isolated from the pancreas of a single deceased donor from the solid organ and tissue deceased donation sector, DonateLife. There was a 50% decrease in the total number of Pancreas islet donations. Figure 11.15 shows the breakdown of pancreas islets donations for 2016 compared to 2015.

Figure 11.16 Pancreas Islets Donation by Deceased Donors, by Jurisdiction, 2015-2016



Tissue Donation Outcome

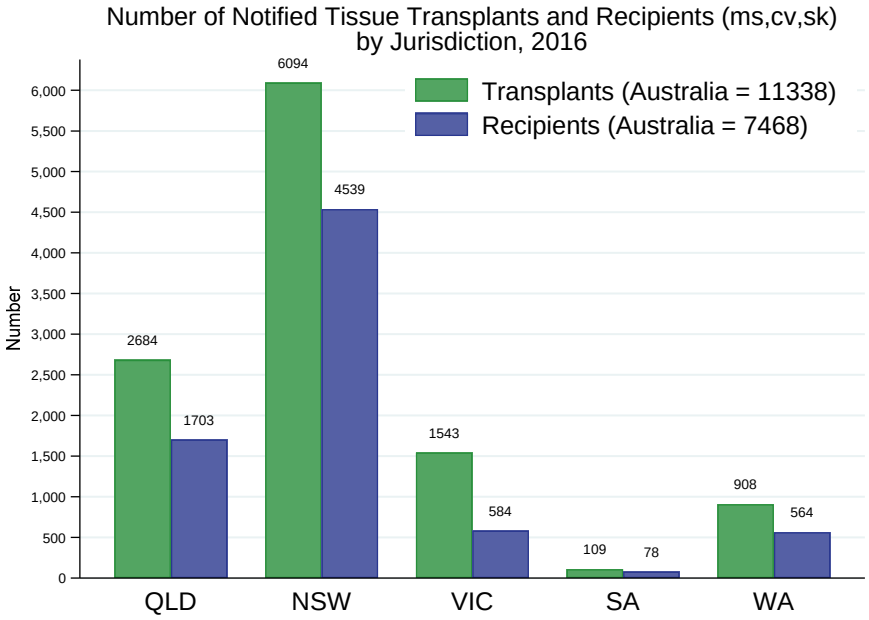
In 2016, national tissue donation outcome reporting continued to strengthen with Tissue banks providing the number of notified graft tissue transplants and the number of notified recipients of tissue transplantation.

Musculoskeletal, cardiovascular and skin tissue donated for the purpose of transplantation can be stored for a period of time before a transplant occurs. Therefore, the numbers reported for grafts and recipients of tissue, in this section, represent transplantation outcomes for the reporting period only, not the outcome of donations for the reporting period.

A tissue transplant recipient can receive one or more tissue grafts in one or more transplant events. Tissue transplantation counts are reported by tissue banks as the number of notified transplants and notified recipients from tissue retrieved by that tissue bank.

Figure 11.17 shows the number of notified [1,2] tissue transplants (grafts) and recipients by Jurisdiction for 2016.

Figure 11.17 Number of Notified Tissue Transplants and Recipients, by Jurisdiction, 2016



(1) Notified tissue transplant is defined as the "Number of grafts implanted into recipients, that banks have been notified of".

(2) Notified tissue recipient is defined as the "Number of recipients notified to the bank, who receive one or more graft implants during a single transplant event".

Tissue Donation Outcome by Tissue Type

The following graphs represent the outcome of tissue donation by tissue type and the number of recipients who received tissue graft transplant by tissue type. (Figures 11.18 to Figure 11.21)

Figure 11.18 shows the number of notified[1,2] musculoskeletal tissue transplants and recipients, by Jurisdiction, for 2016. In Australia, there were 7,073 recipients who received 9,372 musculoskeletal transplants. Compared with the previous year, this is an increase of 15.8% on the total number of recipients (6,107 in 2015) and 6% on the total number of transplants (8,854 in 2015).

Figure 11.18 Number of Notified Musculoskeletal Transplants and Recipients, by Jurisdiction, 2016

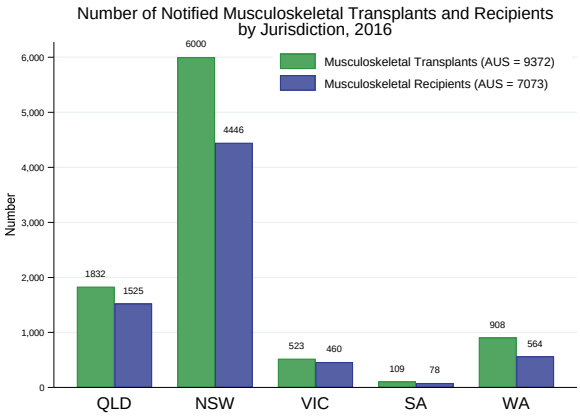


Figure 11.19 shows the number of notified[1,2] cardiovascular tissue transplants and recipients by Australian Jurisdiction, for 2015. In Australia, there were 230 recipients who received 234 cardiovascular transplants.

Figure 11.19 Number of Notified Cardiovascular Transplants and Recipients, by Jurisdiction, 2016

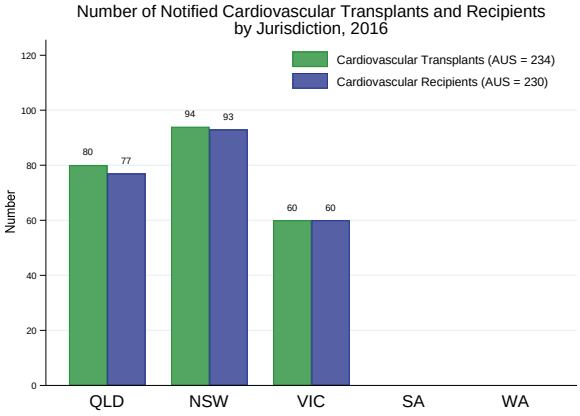
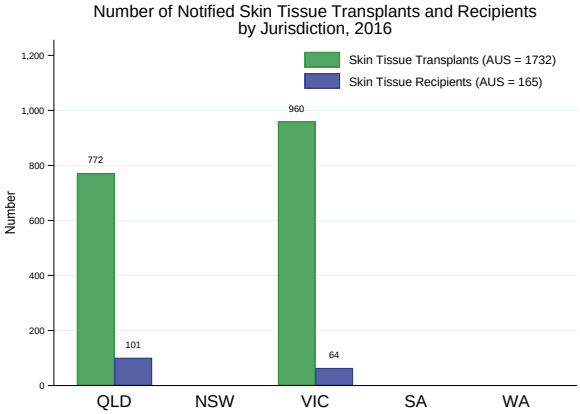


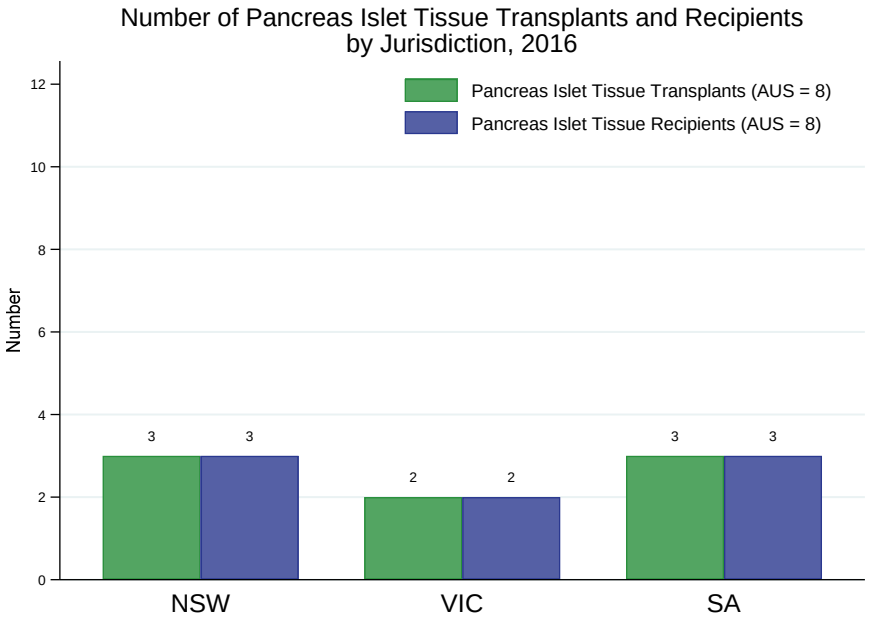
Figure 11.20 shows the number of notified [1,2] skin tissue transplants and recipients by Jurisdiction, for 2016. In Australia, there were 165 recipients who received 1,732 skin transplants, an increase of 85% of the total number of recipients compared with 2015 (89).

Figure 11.20 Number of Notified Skin Transplants and Recipients, by Jurisdiction, 2016



In Australia, there are three pancreas islets transplanting units (Westmead in New South Wales, Monash in Victoria and Royal Adelaide Hospital in South Australia). Figure 11.21 shows the number of notified pancreas islets transplants and recipients by Jurisdiction, for 2016. There were 8 recipients who received pancreas islets transplants.

Figure 11.21 Number of Notified Pancreas Islets Transplants and Recipients, by Jurisdiction, 2016



Eye Donors

The total numbers reported in this section may include duplicate counts of donors that are also multi-organ and tissue donors or multi-tissue donors, where the donor coordination was performed by another donation agency. Where there is no eye bank in a jurisdiction, eye donation is managed from a satellite Jurisdiction.

This data is sourced from Australian eye banks in conjunction with EBAANZ.

Figure 11.22 represents the number of eye donors from each Australian Jurisdiction for the reporting period 2015 to 2016. In 2016 there were 1,280 eye donors (Figure 11.23), compared with 1,266 in 2015.

Figure 11.22 Number of Eye Donors by Jurisdiction, 2015-2016

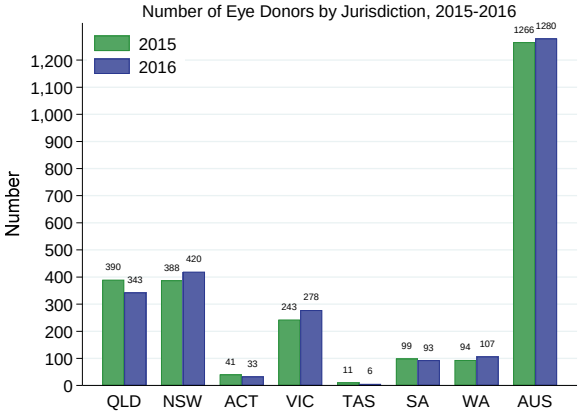
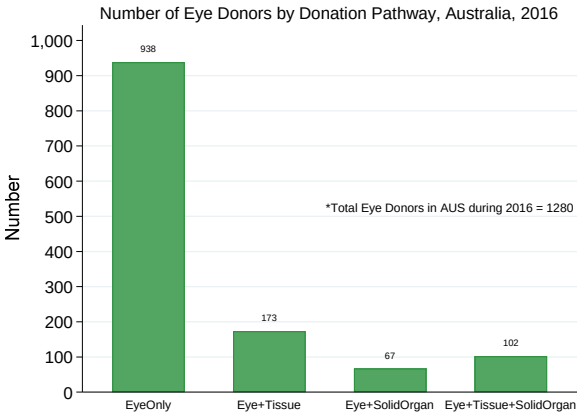


Figure 11.23 Number of Eye donors by Donation Pathway, Australia, 2016



Figures 11.24 to 11.27 represent the number of donors for jurisdictions, in 2016, by donor type. In 2016 there were 938 eye only donors (Figure 11.24), 173 donors who donated eye and tissue (Figure 11.25), 67 donors who donated eye and one or more solid organs (Figure 11.26) and 102 donors who donated eye, tissue and one or more solid organs (Figure 11.27).

Figure 11.24 Number of Eye Donors by Jurisdiction, 2016

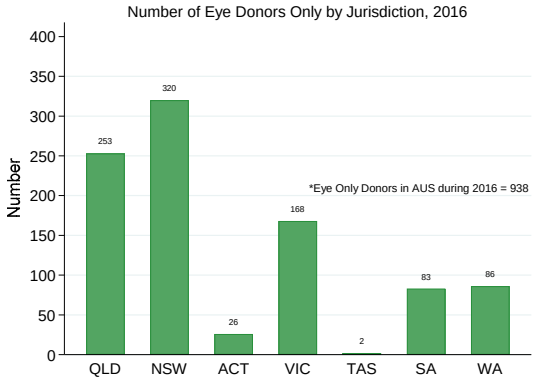


Figure 11.25 Number of Eye and Tissue Donors by Jurisdiction, 2016

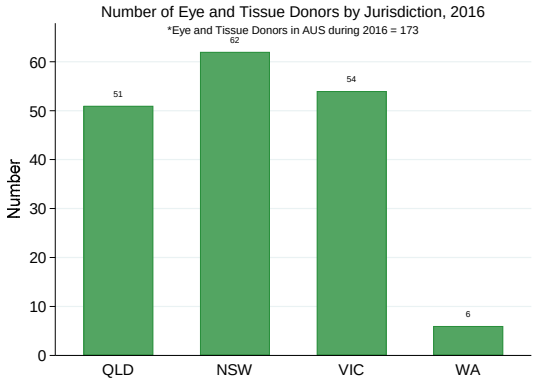


Figure 11.26 Number of Eye and Solid Organ Donors by Jurisdiction, 2016

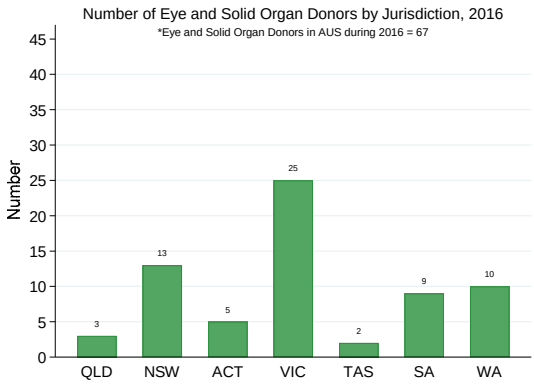
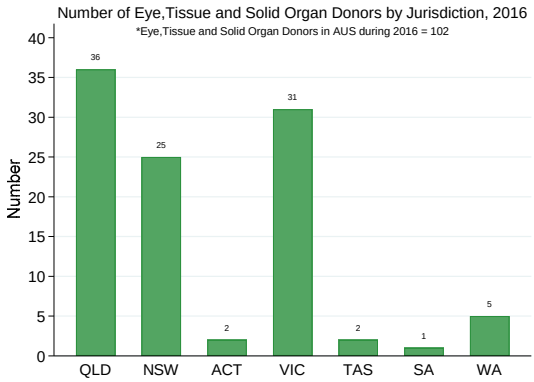


Figure 11.27 Number of Eye, Tissue and Solid Organ Donors by Jurisdiction, 2016



Eye Donation Outcome

Eye banks continued to contribute additional data elements to the national reporting in 2016 by reporting notified[1,2] corneal graft and sclera transplantation numbers across Australia. This further strengthened the collection and reporting of eye donation and outcomes and supplements reporting by EBAANZ and the Corneal Graft Registry (ACGR) reporting. Data was sourced from eye banks in Australia.

For 2016, there were 2,085 corneal transplants and 716 sclera transplants. Other outcome data, such as, follow up data, corneal grafts survival, trends in corneal transplant practice and comparisons between cornel graft procedures is reported by the ACGR.

Considerable further information is available at https://www.flinders.edu.au/medicine/sites/ophthalmology/clinical/the-australian-corneal-graft-registry.cfm.

Figure 11.28 and 11.29 show the number of notified corneal transplants and sclera units transplanted by jurisdiction for 2016.

Figure 11.28 Number of Notified Corneal Transplants by Jurisdiction for 2016

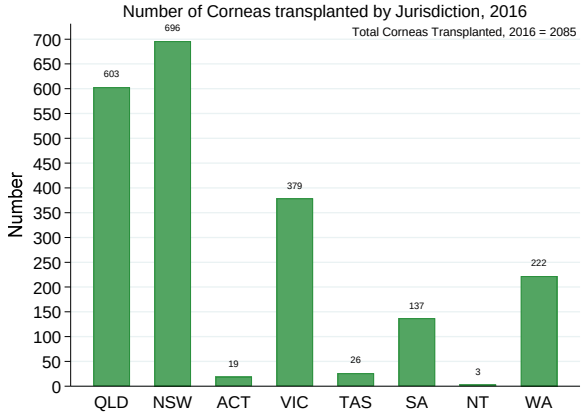
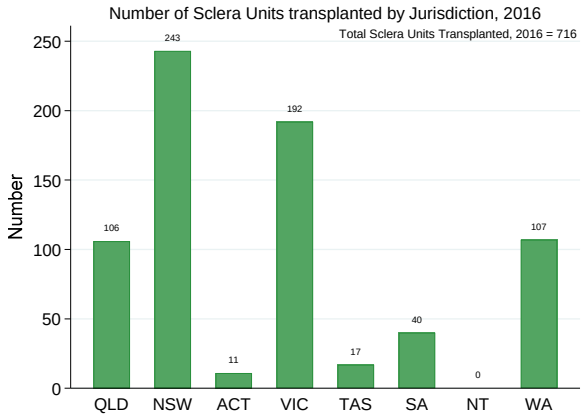


Figure 11.29 Number of Sclera Units Transplanted by Jurisdiction, 2016



(1) Notified tissue transplant is defined as the "Number of grafts implanted into recipients, that banks have been notified of".

(2) Notified tissue recipient is defined as the "Number of recipients notified to the bank, who receive one or more graft implants during a single transplant event".

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 11: Eye and Tissue Donation Data. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at www.anzdata.org.au

SECTION 12

Organ Waiting List

SUMMARY

This chapter brings together waiting list data for the various organs. This data is not directly collected by ANZOD, but has been provided by the relevant transplant outcome Registries. In many cases more detailed information is contained in the annual reports of the relevant transplant outcome Registries. There are, however, important general considerations in interpretation of waiting list data.

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Waiting List Dynamics

There are some important caveats to consider when interpreting the waiting list data presented in this report.

Firstly, waiting list data is not necessarily a good indicator of actual demand for transplantation. Due to the limited availability of organs for transplantations not all people with end stage organ disease are able to be treated with transplantation and therefore each organ waiting list employs criteria for listing in order to prioritise the use of organs.

There are many rules guiding eligibility for transplantation, for example, listing on the kidney transplant waiting list requires an 80% expected survival at 5 years post transplantation. For further information please see the organ transplantation from deceased donor consensus statement on eligibility criteria and allocation protocols. (www.tsanz.com.au/organallocationprotocols/index.asp).

Secondly, the reasons for removal from the waiting list also vary. In some cases, an individual may pass away before receiving an organ. In other cases (particularly cardiothoracic and liver waiting lists) they may be removed due to improving health; conversely removal may reflect deteriorating health such that the risks of transplantation outweigh benefits. Data regarding whether these people subsequently return to the waiting list, remain off the list, or die without returning to the list is not collected at this stage.

Thirdly, the waiting list data refers only to people on the “active” waiting list who would be transplanted immediately if an organ were available. For some organs, there are groups of patients who have been assessed but not yet activated on the waiting list, or who are temporarily removed or made “inactive”. For example, patients may develop a medical problem that makes them temporarily or permanently unfit for transplantation.

Residents of Australia or New Zealand who have transplants performed abroad may not be reported to local transplant outcome Registries and may not impact on the wait list stock and flow.

For all organs, data is presented in a “stock and flow” format, examining the transitions on and off the waiting list over the period of a calendar year. It is possible those removed from the waiting list are subsequently re-listed. For organs that have criteria for urgent transplant (i.e. liver, heart, lung) patients may be placed on the waiting list and removed very quickly and therefore annual census numbers do not represent the activity and readers should refer to the “made active” number to get an idea of overall activity.

The figures in the tables refer to the lists at 1 January and 31 December of each year.

In the tables presented in this chapter, the rows describe:

- Number on the active list at the beginning of each year
- Number added to the active list during the year
- Number removed from the active list during the year
- Number of deceased donor (DD) transplants to people on the waiting list
- Number of living donor (LD) transplants to people on the waiting list
- Number of transplants performed outside Australia / New Zealand to people on the waiting list
- Number who died while on the active waiting list

Number on the active waiting list at the end of the year

Kidney Waiting List

Data for these waiting lists are derived from the from National Organ Matching System (NOMS) of Australia combined with material from the ANZDATA Registry. Some people in the deceased donor (DD) kidney waiting lists may receive a kidney from a living donor (LD), though the majority of living kidney donor recipients are not on the waiting lists. A patient is deemed fit for transplantation and activated on the deceased donor transplant list but a living donor kidney can be made available prior to a deceased donor transplant taking place. These two groups are illustrated separately.

Data is currently only available for Australia. Negotiations are continuing to also include New Zealand data in future reports.

Further material is available in the ANZDATA Annual Report at www.anzdata.org.au

Table 12.1

Deceased Donor Kidney Waiting List -Stock and Flow, 2010 - 2016								
	Event	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Australia	**Active start of year**	1266	1185	1089	1078	1077	1145	1072
	Made active	630	708	747	779	854	768	827
	Taken off list	149	199	154	141	148	156	136
	DD graft	499	532	553	581	573	633	760
	LD graft	58	62	45	54	56	42	37
	Overseas graft	1	2	0	1	0	2	?
	Died on list	4	9	6	3	9	8	8
	Active end of year	**1185**	**1089**	**1078**	**1077**	**1145**	**1072**	**957**

Data may differ to that previously published as data is updated in subsequent years in NOMS and ANZDATA

Liver Waiting List

This table includes the waiting lists for both Australia and New Zealand. For liver transplantation, the waiting list is extracted from the Australia and New Zealand Liver Transplant Registry (ANZLTR) Annual Report, based on returns from transplanting centres. More detailed analyses can be found in the Report, at http://www.anzltr.org/.

Table 12.2

Deceased Donor Liver Waiting List Activity, 2013-2016					
Country	**Event**	**2013**	**2014**	**2015**	**2016**
Australia	**Active start of year**	165	145	186	186
	Made active	317	347	335	337
	Taken off list	66	55	52	73
	DD graft	248	234	265	312
	Died on List	24	16	18	8
	Active end of year	**145**	**186**	**186**	**130**
New Zealand	**Active start of year**	21	19	21	24
	Made active	43	56	61	70
	Taken off list	5	14	7	11
	DD graft	31	38	45	55
	Died on list	5	2	3	4
	Active end of year	**19**	**18**	**27**	**24**

Cardiothoracic Organ Waiting List

Waiting lists for heart transplants: lung transplants and heart-lung transplants are collated by the Australia and New Zealand Cardiothoracic Organ Transplant Registry (ANZCOTR), based on reports from transplant units. The data in the tables are supplied by the ANZCOTR, and include both Australia and New Zealand waiting list data. Further material for each organ is available in the ANZCOTR Annual Report at http://www.anzcotr.org.au/.

Heart

Table 12.3

Deceased Donor Heart Waiting List Activity, 2010 - 2016								
	Event	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Australia	**Active start of year**	45	46	65	64	48	60	44
	Made active	89	107	92	91	127	98	142
	Taken off list	15	16	13	19	32	15	13
	DD graft	65	65	73	77	78	93	124
	LD graft	0	0	0	0	0	0	1
	Died on list	8	7	7	11	5	5	4
	Active end of year	**46**	**65**	**64**	**48**	**60**	**44**	**44**
New Zealand	**Active start of year**	7	11	13	14	10	8	13
	Made active	19	20	19	18	18	19	18
	Taken off list	4	5	5	9	3	4	4
	DD graft	11	11	12	9	17	10	11
	LD graft	0	0	0	0	0	0	0
	Died on list	0	2	1	4	0	0	2
	Active end of year	**11**	**13**	**14**	**10**	**8**	**13**	**14**

Lung

Table 12.4

Deceased Donor Lung Waiting List Activity, 2010 - 2016								
	Event	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Australia	**Active start of year**	102	116	99	94	96	111	85
	Made active	167	182	171	206	223	211	234
	Taken off list	13	24	11	23	29	33	13
	DD graft	126	162	149	169	166	195	124
	Died on list	14	13	11	13	14	9	11
	Active end of year	**116**	**99**	**99**	**95**	**110**	**85**	**77**
New Zealand	**Active start of year**	6	8	13	13	13	13	5
	Made active	17	17	24	21	18	19	24
	Taken off list	3	2	9	1	0	4	2
	DD graft	9	10	12	19	17	23	17
	Died on list	3	0	4	1	1	0	2
	Active end of year	**8**	**13**	**13**	**13**	**13**	**5**	**8**

Pancreas Waiting List

Data for the pancreas transplant waiting list is derived from data supplied by hospitals to the Australian and New Zealand Pancreas and Islets Transplant Registry (ANZPITR). It includes both people waiting for a combined kidney-pancreas transplant (the majority) and those waiting for a pancreas transplant alone. It does not include people waiting for pancreas islet cell transplants.

Table 12.5

Deceased Donor Pancreas Transplant Waiting List Activity, 2014 - 2016				
Country	**Event**	**2014**	**2015**	**2016**
Australia	**Active start of year**	63	59	88
	Made active	38	42	69
	Taken off list	14	12	24
	DD graft	43	45	51
	Died on List	4	4	4
	Active end of year	**59**	**40**	**81**
New Zealand	**Active start of year**	7	4	4
	Made active	3	4	7
	Taken off list	3	1	3
	DD graft	2	3	4
	Died on list	1	0	0
	Active end of year	**4**	**4**	**4**

Intestine

Data for the intestine transplant waiting list is derived from data supplied by hospitals to the Australian and New Zealand Liver Transplant Registry. It includes both people waiting for a combined organ and intestine transplant (the majority) and those waiting for an intestine only transplant.

Data included in this report is on 2016 activity only.

Table 12.6

Deceased Donor Intestine Waiting List Activity, 2016		
Country	**Event**	**2016**
Australia	**Active start of year**	5
	Made active	0
	Taken off list	0
	DD graft	1
	Died on List	0
	Active end of year	4

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 12: Organ Waiting List. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at www.anzdata.org.au

SECTION 13

Transplant Outcome Data

SUMMARY

This chapter reports graft survival at 1 and 5 years for solid organ transplants performed in Australia and New Zealand. Data provided here is supplied by each of the transplant outcome registries.

Contents

Transplant Outcomes

Graft survival is defined as having sufficient function from a transplanted organ to maintain life without other organ replacement therapy. The tables below give the percentage of patients at 1 and 5 years post-transplant who are alive and have not undergone re-transplantation or recommenced organ replacement therapy. For kidney transplant recipients return to dialysis indicates a loss of graft function. For pancreas transplant recipients, the recommencement of insulin therapy is considered loss of graft function.

All tables show the percentage of grafts functioning at 1 and 5 years post-transplant. Kidney graft survival is calculated using the Kaplan Meier method. “n” indicates the number at risk at 1 and 5 years for each era. Graft survival is censored at date of last follow up by not for death and is unadjusted.

Further information on transplant outcomes is available for each organ at the websites of the relevant transplant outcome registries.

www.anzdata.org.au

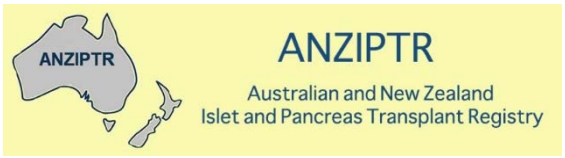
ANZDATA collects and reports the incidence, prevalence and outcome of dialysis treatment and kidney transplantation for patients with end stage kidney disease across Australia and New Zealand.

www.anzltr.org

ANZLTR are the collection, collation and reporting of data relating to activity and outcomes of liver transplantation in Australia and New Zealand. Data is collected on all patients listed for liver transplantation in Australia and New Zealand

www.anzcotr.org.au

ANZCOTR contains information on every heart, heart/lung and lung transplant performed in Australia and New Zealand.



www.anziptr.org

ANZIPTR registry is responsible for recording and maintaining the islet and pancreas transplants performed in Australia and New Zealand.

Kidney Graft Survival

Table 13.1 refers to all primary kidney-only transplants from deceased donors performed in Australia and New Zealand by era. Data is sourced from the Australia and New Zealand Dialysis and Transplant (ANZDATA) Registry.

Table 13.1

Graft survival rates following kidney transplantation, by era of transplant performed					
Country	**Era**	**Number at risk at 1 year**	**Graft Survival at 1 year: % [95% Confidence Interval]**	**Number at risk at 5 years**	**Graft Survival at 5 years: % [95% Confidence Interval]**
Australia	**2007-2012**	2420	94 [93, 95]	1252	83 [81, 84]
	2008-2013	2690	94 [93, 95]	1014	83 [81, 84]
	2009-2014	2860	95 [94, 95]	702	83 [81, 85]
	2010-2015	2510	94 [94, 95]	395	83 [81, 85]
New Zealand	**2007-2012**	290	94 [91, 97]	165	83 [78, 87]
	2008-2013	290	96 [93, 97]	120	85 [80, 89]
	2009-2014	303	96 [93, 97]	81	85 [79, 89]
	2010-2015	256	96 [93, 98]	38	83 [75, 89]

Note: Survivor function is calculated over full data and evaluated at indicated times.

For more information regarding graft and patient survival, refer to the ANZDATA website www.anzdata.org.au

Liver Graft Survival

Table 13.2 refers to all primary liver transplants performed in Australia and New Zealand by era. Data is sourced from the Australia and New Zealand Liver Transplant (ANZLTR) Registry.

Table 13.2

Graft survival rates following Liver transplantation, by era of transplant performed					
Country	**Era**	**n**	**1 yr survival**	**n**	**5 yr survival**
Australia	**2007-2012**	1053	89%	752	79%
	2008-2013	1144	90%	628	80%
	2009-2014	1177	89%	489	81%
	2010-2015	1260	90%	326	81%
New Zealand	**2007-2012**	221	95%	174	87%
	2008-2013	219	94%	145	87%
	2009-2014	220	92%	111	86%
	2010-2015	227	92%	75	83%

For more information regarding graft and patient survival, refer to the ANZLTR website www.anzltr.org

Cardiothoracic Graft Survival

Table 13.3 refers to all heart and lung transplants performed in Australia and New Zealand by era. Data is sourced from the Australia and New Zealand Cardiothoracic (ANZCOTR) Registry.

Table 13.3

Graft survival rates following Cardiothoracic transplantation, by era of transplant performed						
Organ Type	**Country**	**Era**	**n**	**1 yr survival**	**n**	**5 yr survival**
Heart	**Australia**	**2007-2012**	344	87.1	321	81.2
		2008-2013	358	86.7	299	81.9
		2009-2014	359	87.6	234	82.4
		2010-2015	389	87.8	187	82.9
	New Zealand	**2007-2012**	55	88.7	49	79
		2008-2013	55	88.7	42	75.7
		2009-2014	63	88.7	36	76.6
		2010-2015	63	87.5	26	73.8
Lung	**Australia**	**2007-2012**	646	88.9	462	63.2
		2008-2013	738	91.1	467	66.4
		2009-2014	796	92.5	402	69.1
		2010-2015	859	92.4	326	70.6
	New Zealand	**2007-2012**	50	83.3	38	63.2
		2008-2013	57	81.4	36	61.8
		2009-2014	63	84	30	64.9
		2010-2015	73	83.9	25	65.4

Pancreas Graft Survival

Table 13.4 refers to all pancreas transplants performed in Australia and New Zealand by era. Islet cell transplants are not included. Data is sourced from the Australia and New Zealand Islets and Pancreas (ANZIPTR) Registry.

Table 13.4

Graft survival rates following Pancreas transplantation, by era of transplant performed					
Country	**Era**	**n**	**1 yr survival**	**n**	**5 yr survival**
Australia / New Zealand	**Pre-2000**	138	80.2%	123	73.7%
	2001-2006	162	87.7%	150	83.2%
	Post 2006	293	90.3%	137	86.1%

Survival of pancreas transplants has markedly improved over time. For those transplanted in more recent years, risk of transplant loss was 50.7% lower than those transplanted before 2000. For more information regarding graft and patient survival, refer to the ANZIPTR website www.anziptr.org

Suggested Citation:

ANZOD Registry, 2017 Annual Report, Section 13: Transplant Outcome Data. Australia and New Zealand Dialysis and Transplant Registry, Adelaide, Australia. 2017. Available at www.anzdata.org.au