



Transplantation in Australia and New Zealand

Matthew D. Jose

MBBS (Adel), FRACP, FASN, PhD (Monash), AFRACMA

Professor of Medicine, UTAS

Renal Physician, Royal Hobart Hospital



UNIVERSITY *of*
TASMANIA
AUSTRALIA



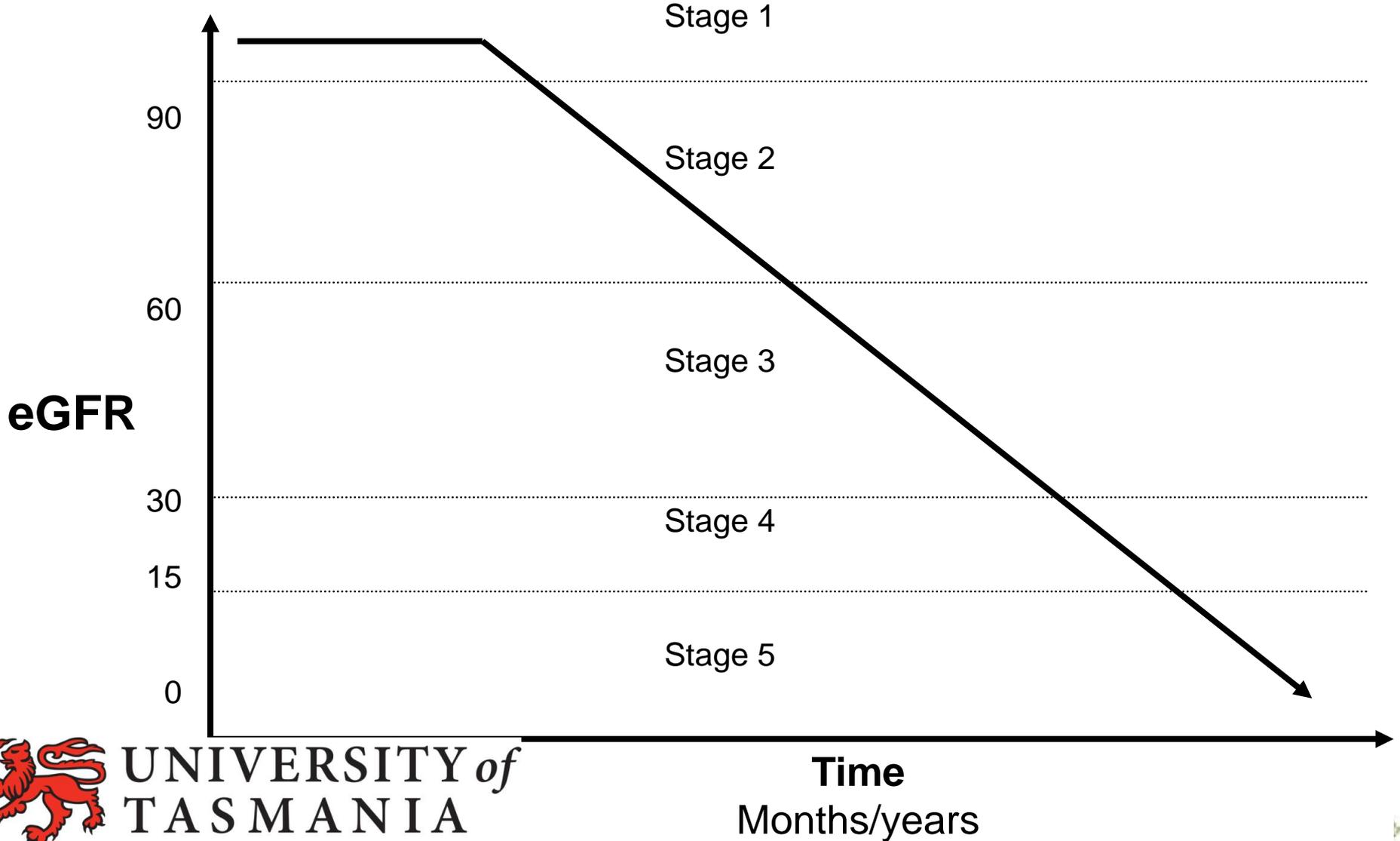
Overview

- CKD in Australia & NZ
- Transplantation decisions in A & NZ
- Kidney donors
- Current immunosuppression
- Morbidity & mortality
- Questions

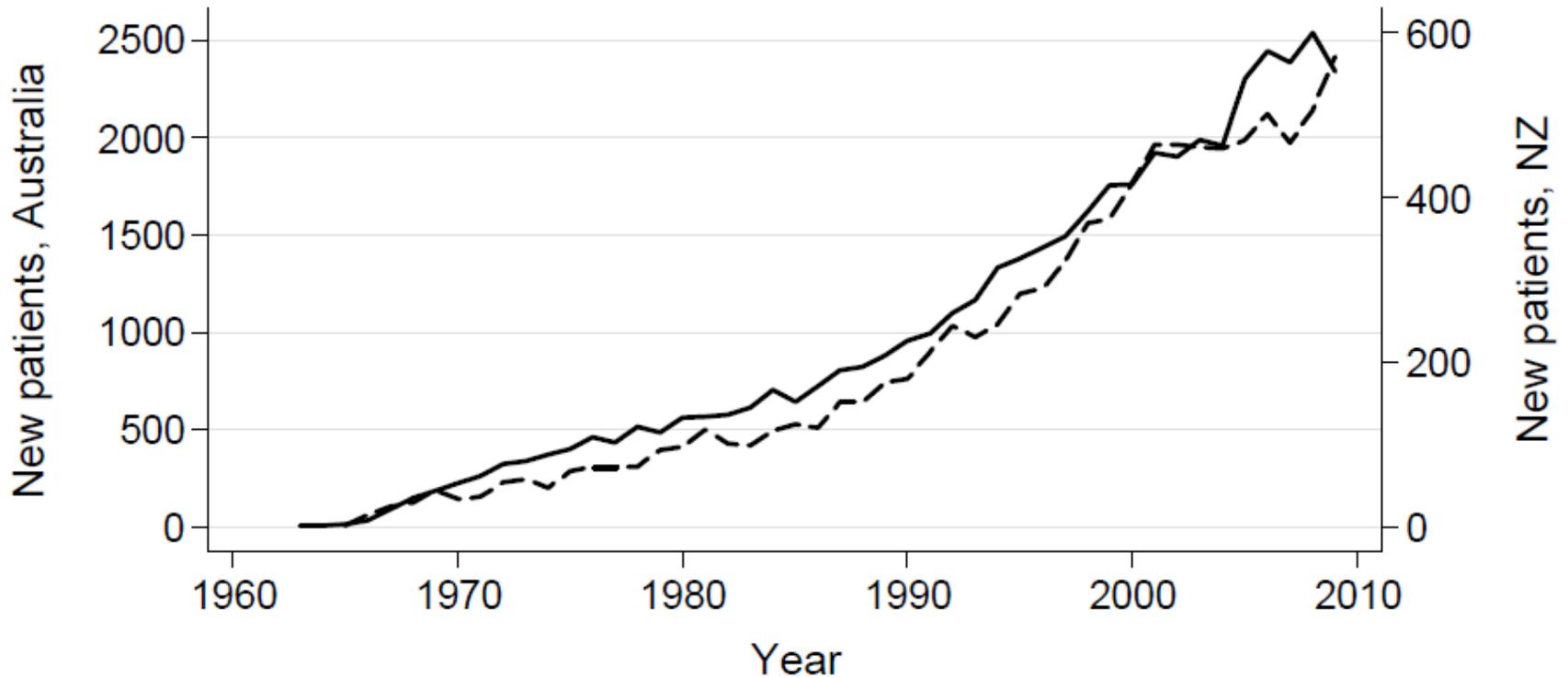
Overview

- CKD in Australia & NZ

Stages of CKD



New Patients Australia and New Zealand



— Australia
- - - NZ

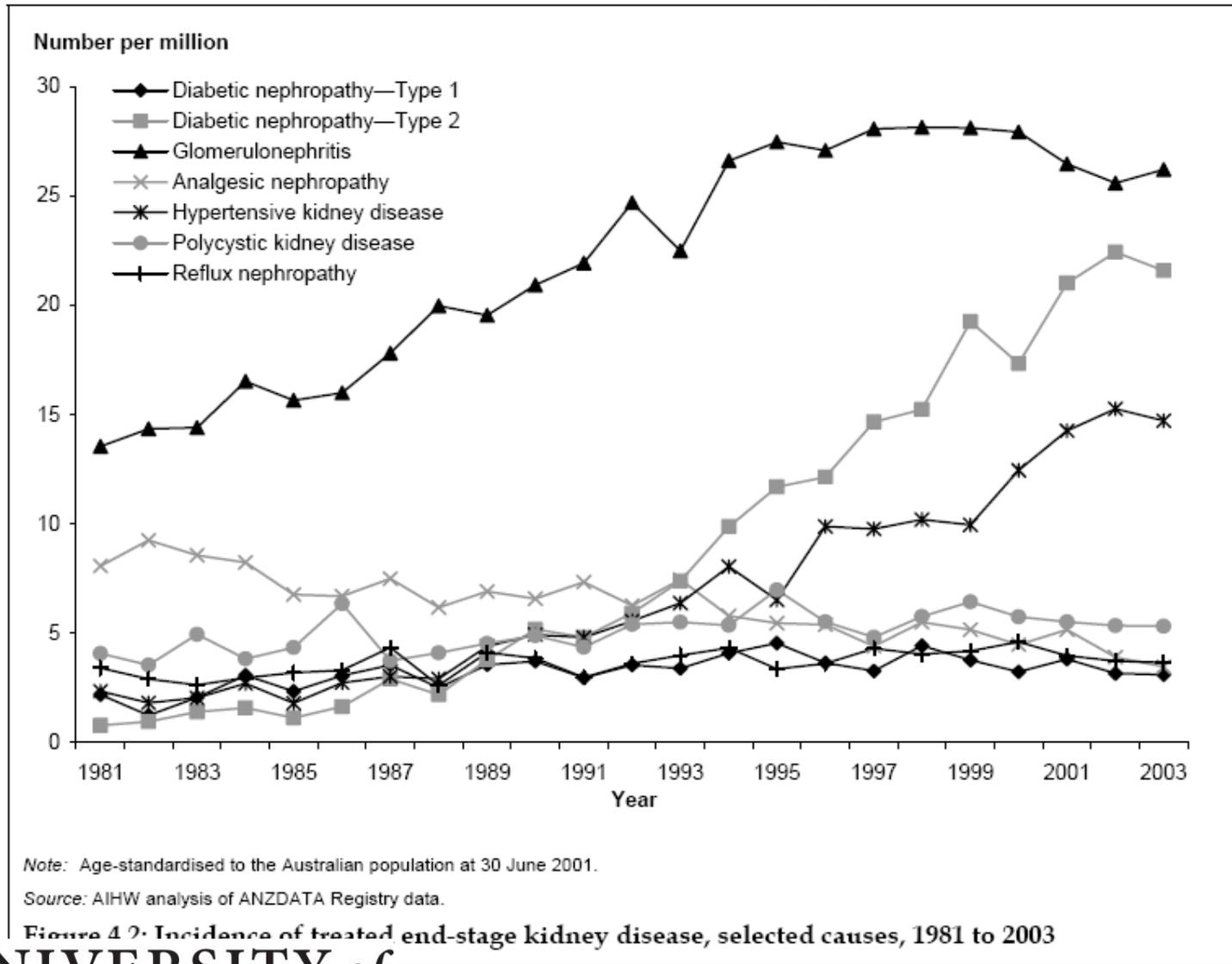


UNIVERSITY of
TASMANIA
AUSTRALIA



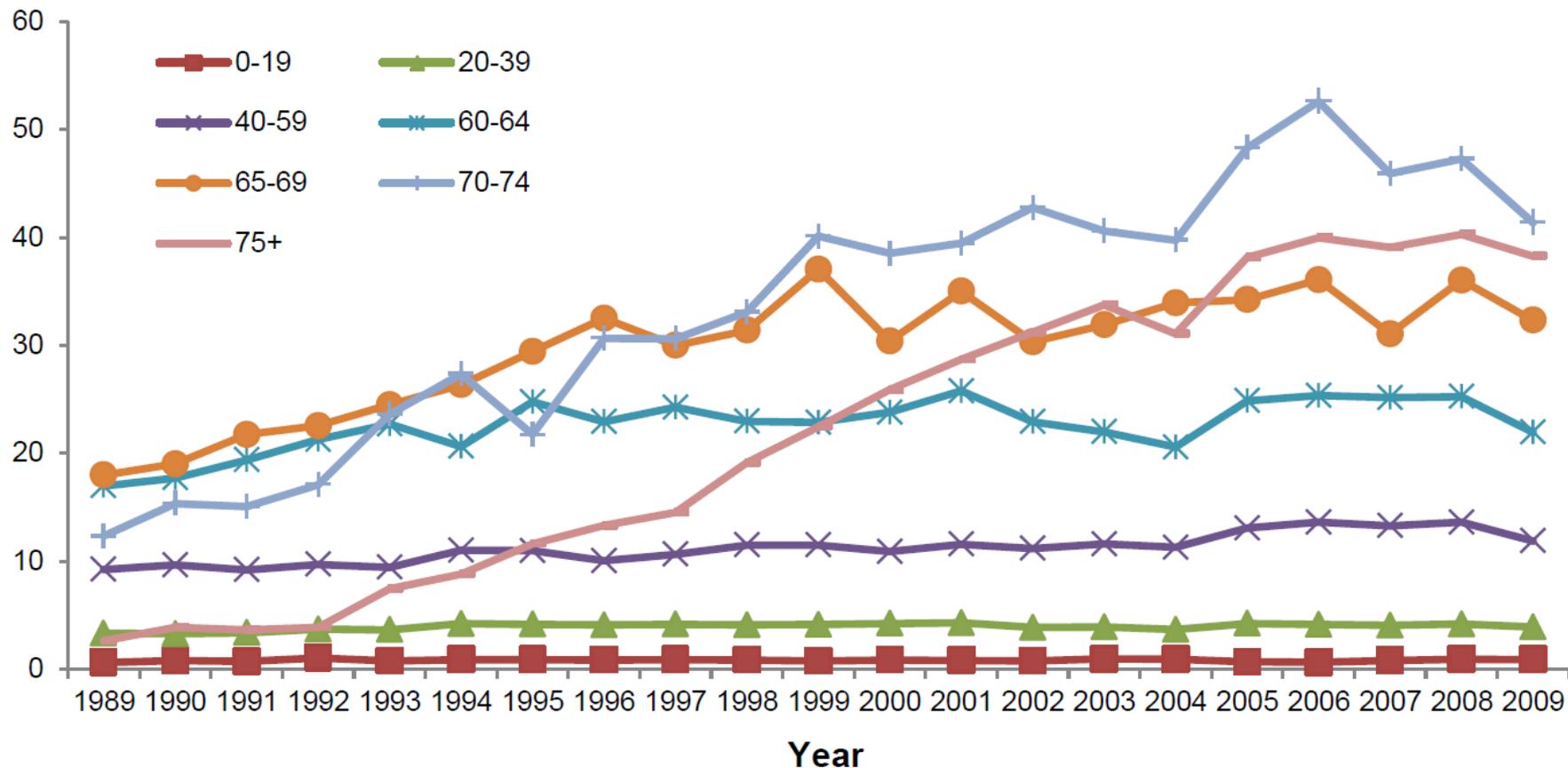
ANZDATA report 2010

Incidence of end-stage CKD



Age-specific incidence rate of treated ESKD

Number per 100,000 population



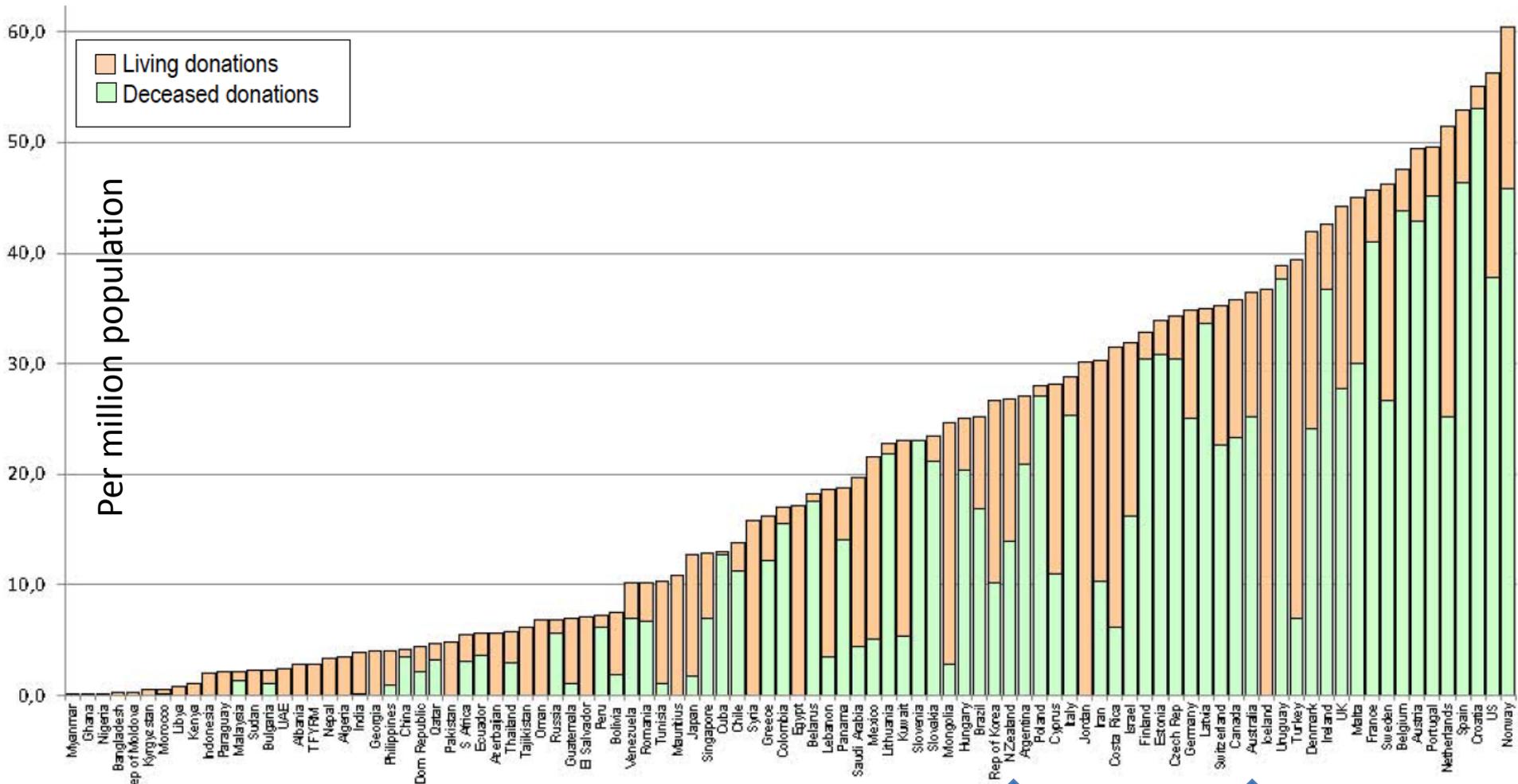
Source: AIHW analysis of ANZDATA.

Figure 1.1: Age-specific incidence rates for treated ESKD, by age, Australia, 1989–2009

Overview

- CKD in Australia & NZ
- Transplantation decisions in A & NZ

International comparisons



Source: Global Observatory on Donation and Transplantation Organ Donation and Transplantation Activities 2011 (updated 10/7/2013).



Figure 8.23

Prevalence of Functioning Transplants

As mode of RRT, Australia 2011

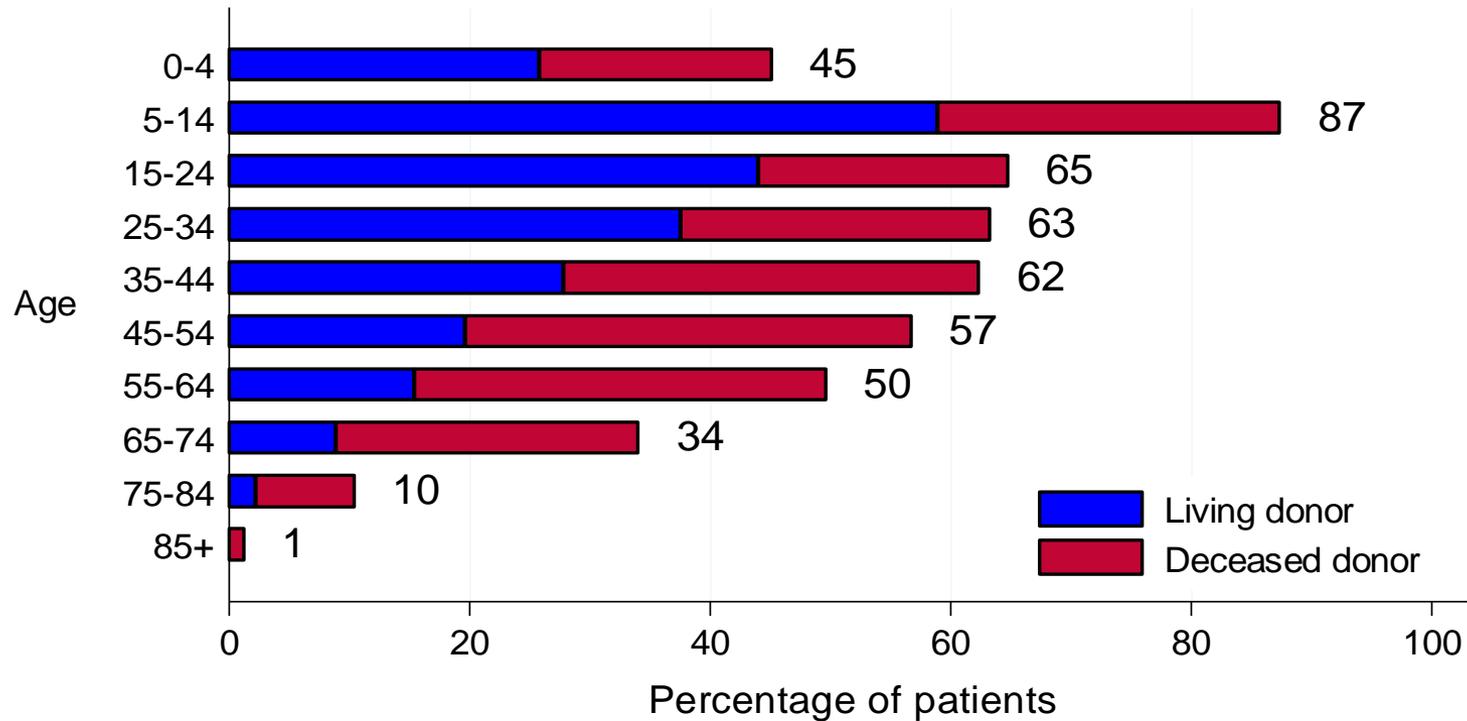
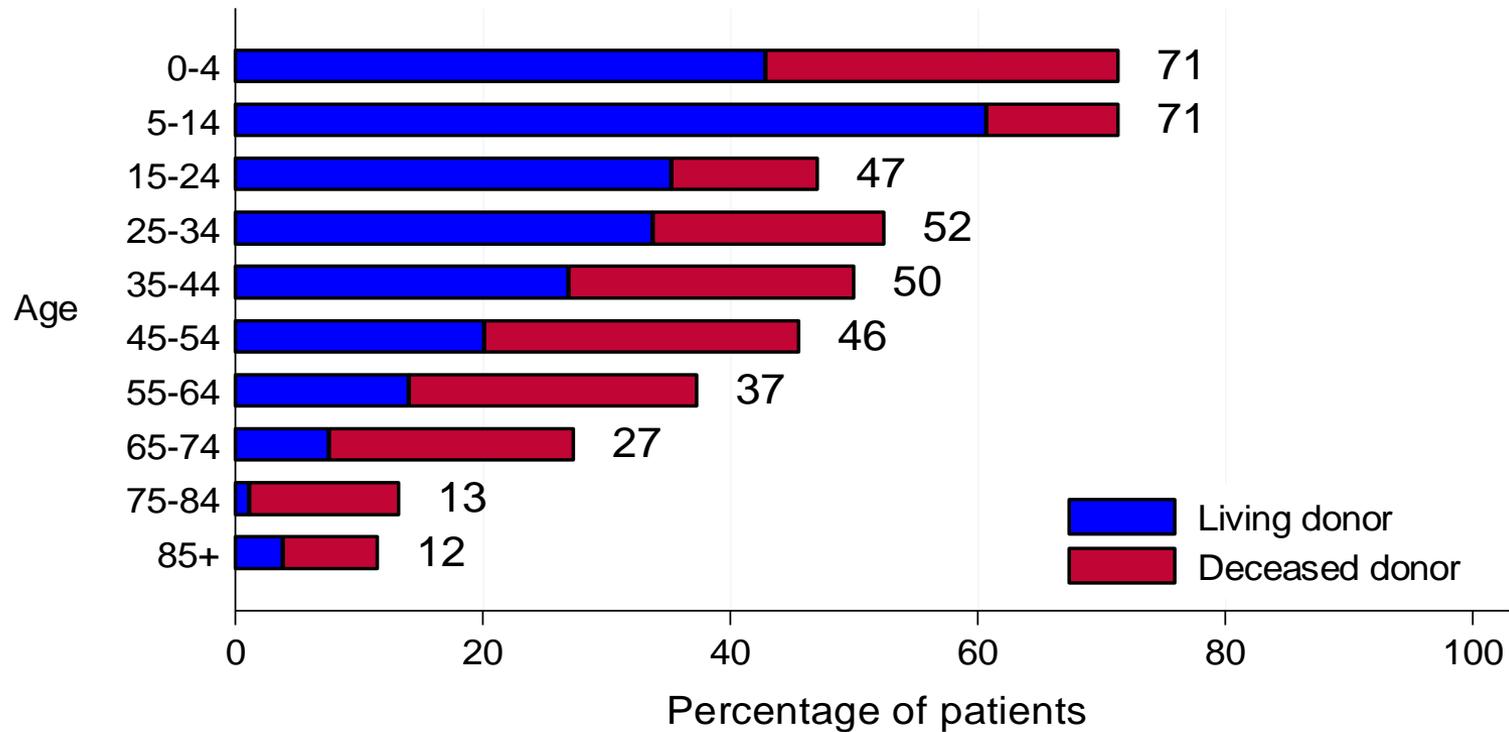


Figure 8.24

Prevalence of Functioning Transplants

As mode of RRT, New Zealand 2011



Overview

- CKD in Australia & NZ
- Transplantation decisions in A & NZ
 - Pre-emptive, living donor transplant



RRT A&NZ – 2011-12



2,937 new starts*

117

pre-emptive Tx

4%



Transplant

9,968

2,820

new dialysis

96%



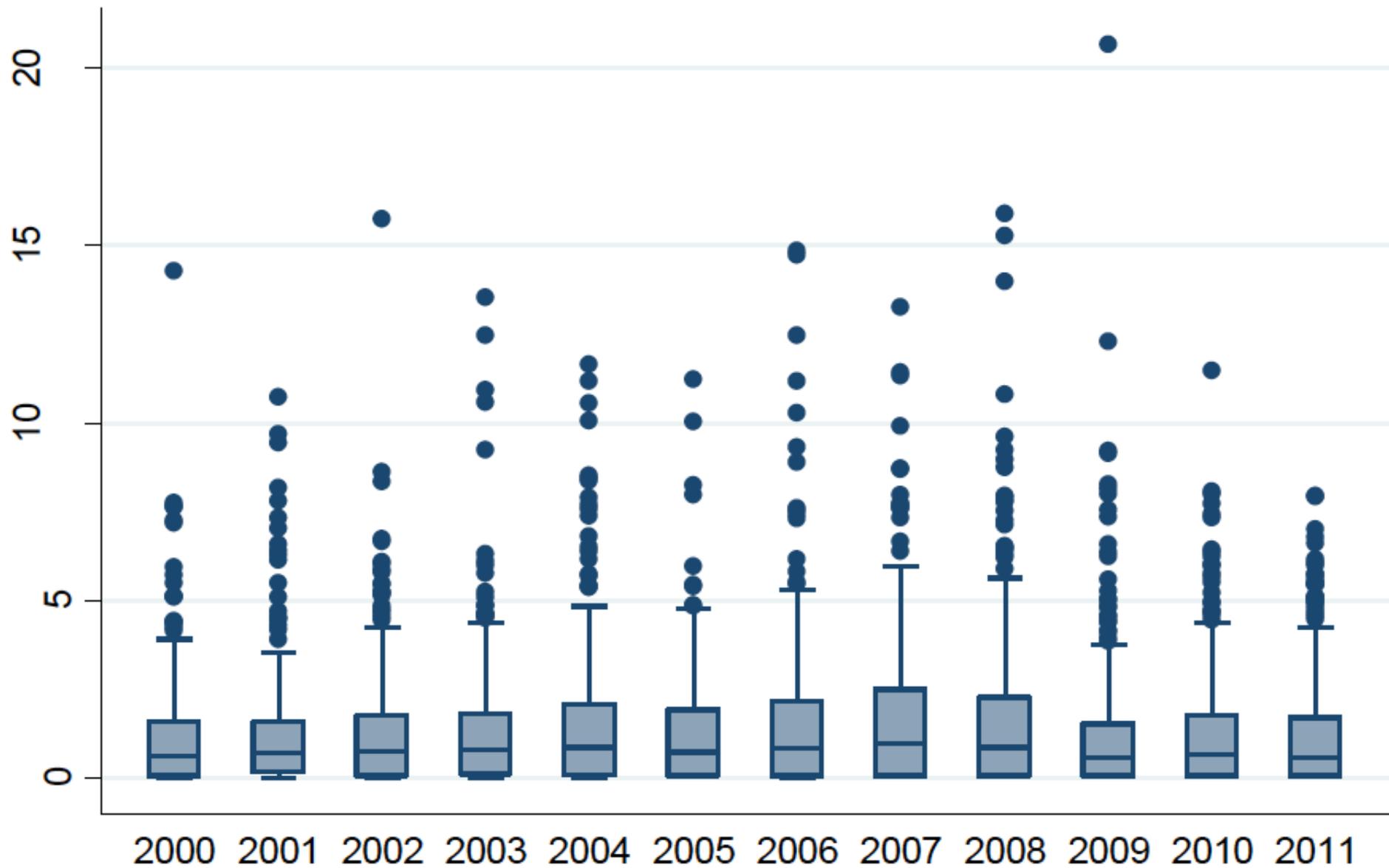
Dialysis

13,063

***Similar number do not receive RRT. See Sparke et al, AJKD 2012**

Waiting time for live donor transplant

Australia/NZ 2000-2011

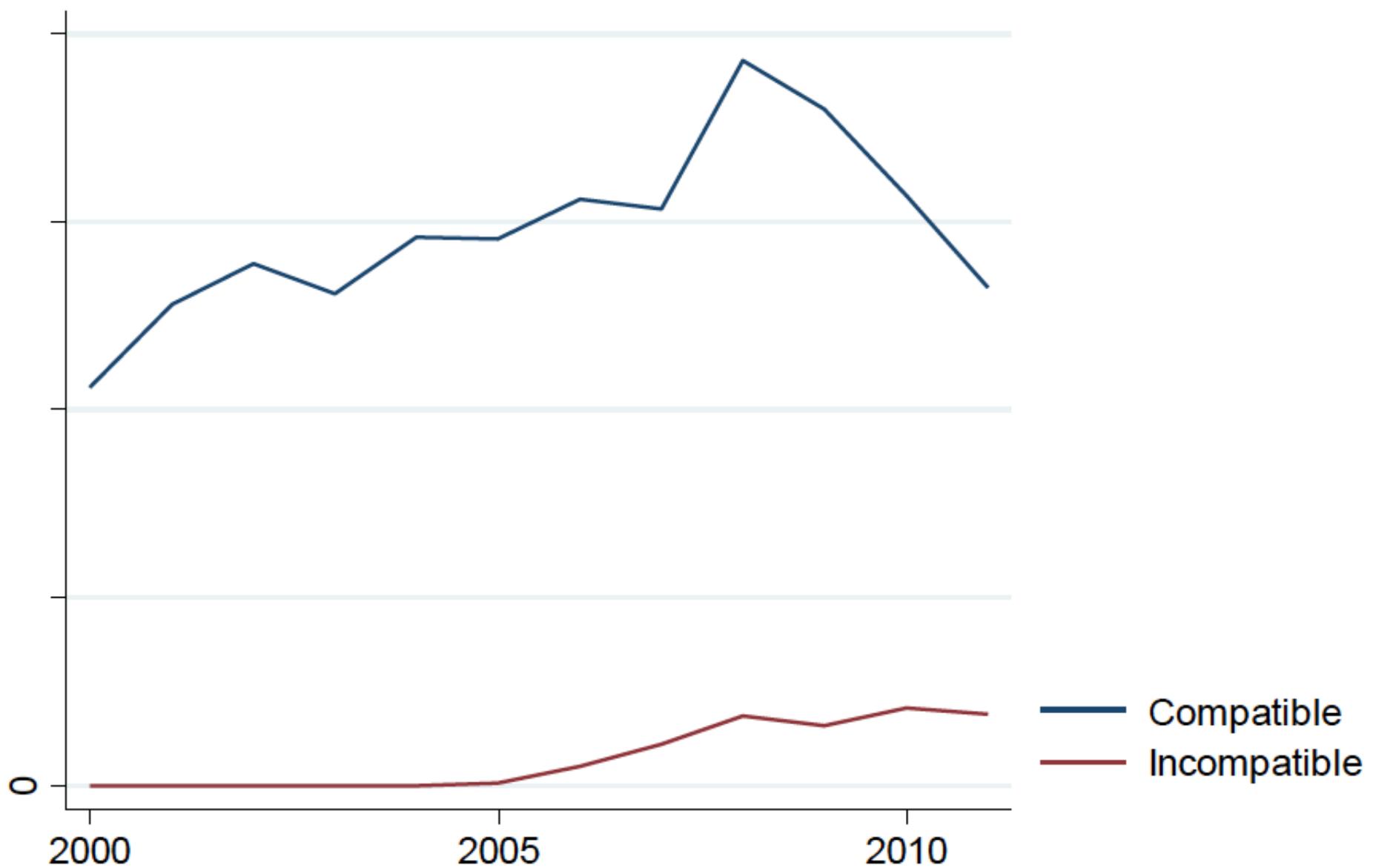


Overview

- CKD in Australia & NZ
- Transplantation decisions in A & NZ
 - Pre-emptive, living donor transplant
 - Living donor transplant
 - ABO-compatible or incompatible

ABO compatible and incompatible live donor transplants

Australia/NZ 2000-2011



Overview

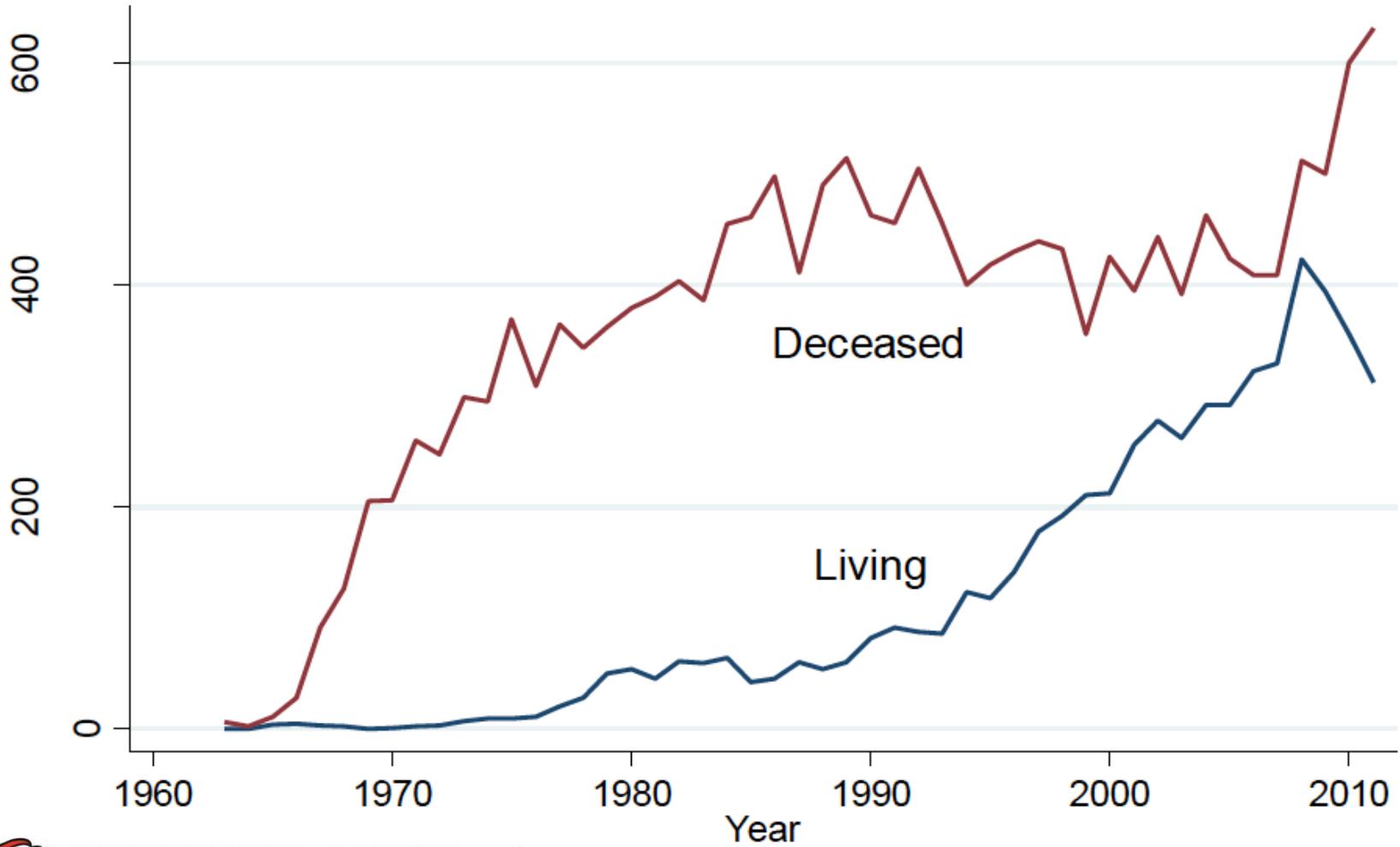
- CKD in Australia & NZ
- Transplantation decisions in A & NZ
 - Pre-emptive, living donor transplant
 - Living donor transplant
 - ABO-compatible or incompatible
 - Paired kidney exchange

Overview

- CKD in Australia & NZ
- Transplantation decisions in A & NZ
 - Pre-emptive, living donor transplant
 - Living donor transplant
 - ABO-compatible or incompatible
 - Paired kidney exchange
 - Deceased donor transplant waiting list

Living and deceased donor transplants

Australia/NZ 1963-2011



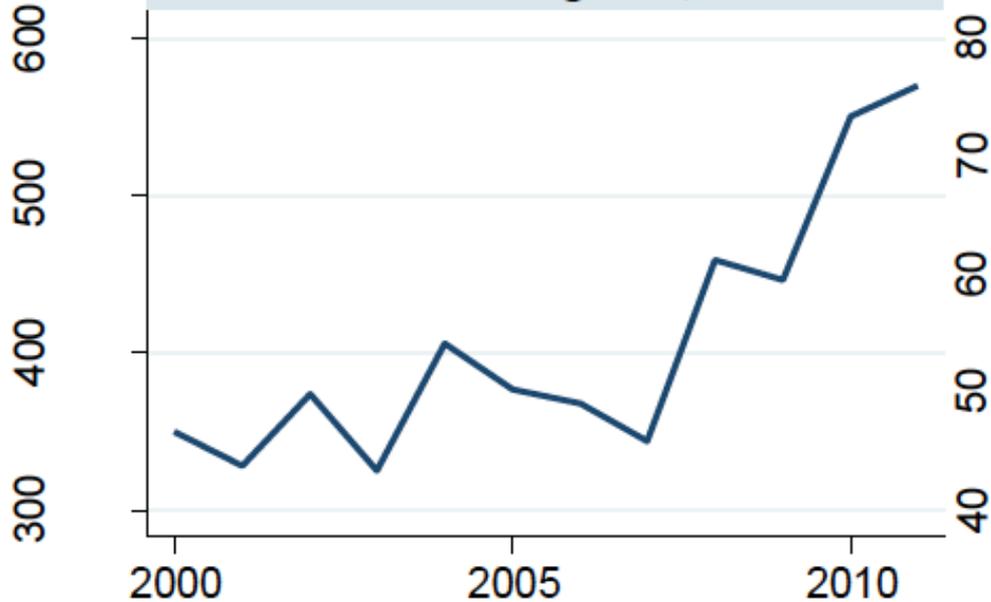
Living donor grafts, Australia



Living donor grafts, New Zealand



Deceased donor grafts, Australia



Deceased donor grafts, New Zealand



Live donor transplants by recipient diabetic status

Australia/NZ 2000-2011

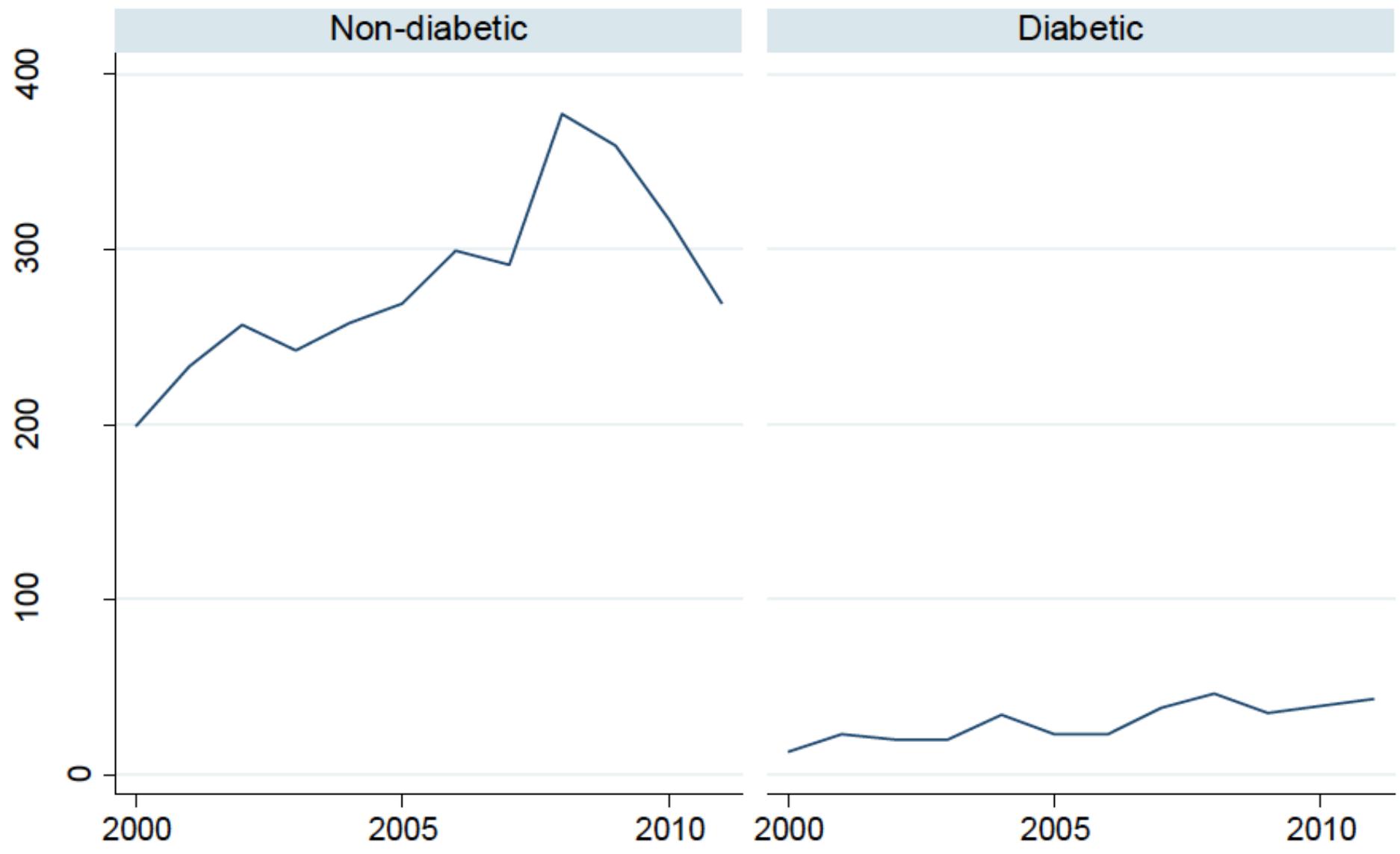


Figure 8.10

Transplant Operations (per million) 2011

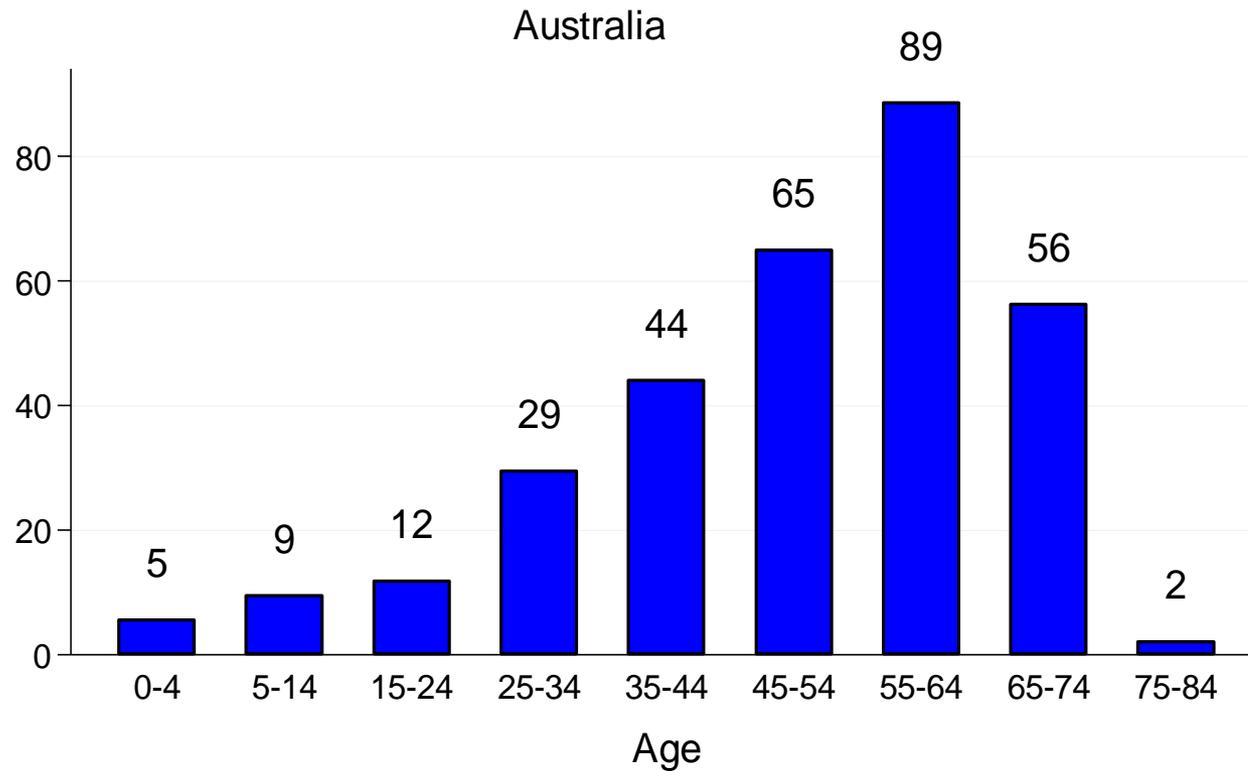


Figure 8.11

Transplant Operations (per million) 2011

New Zealand

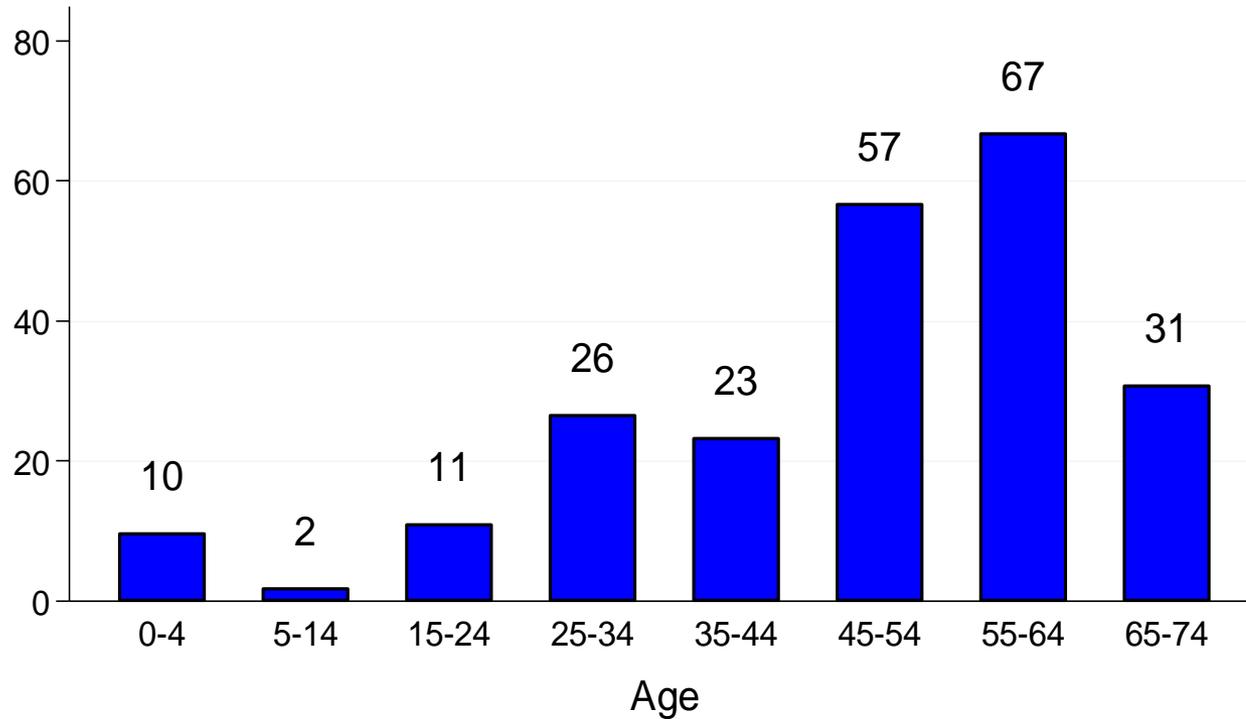


Figure 8.7

Ratio of Transplantation 2011 - Australia

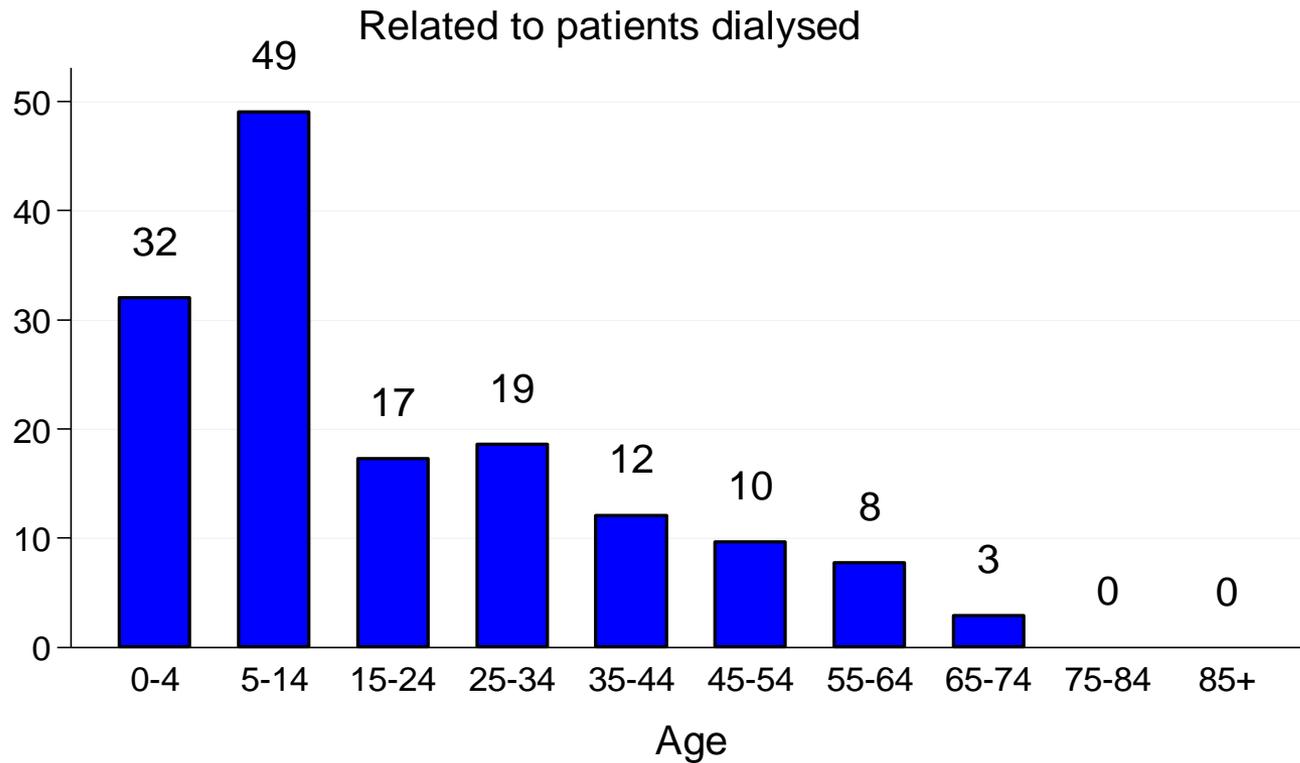


Figure 8.8

Ratio of Transplantation 2011 - New Zealand

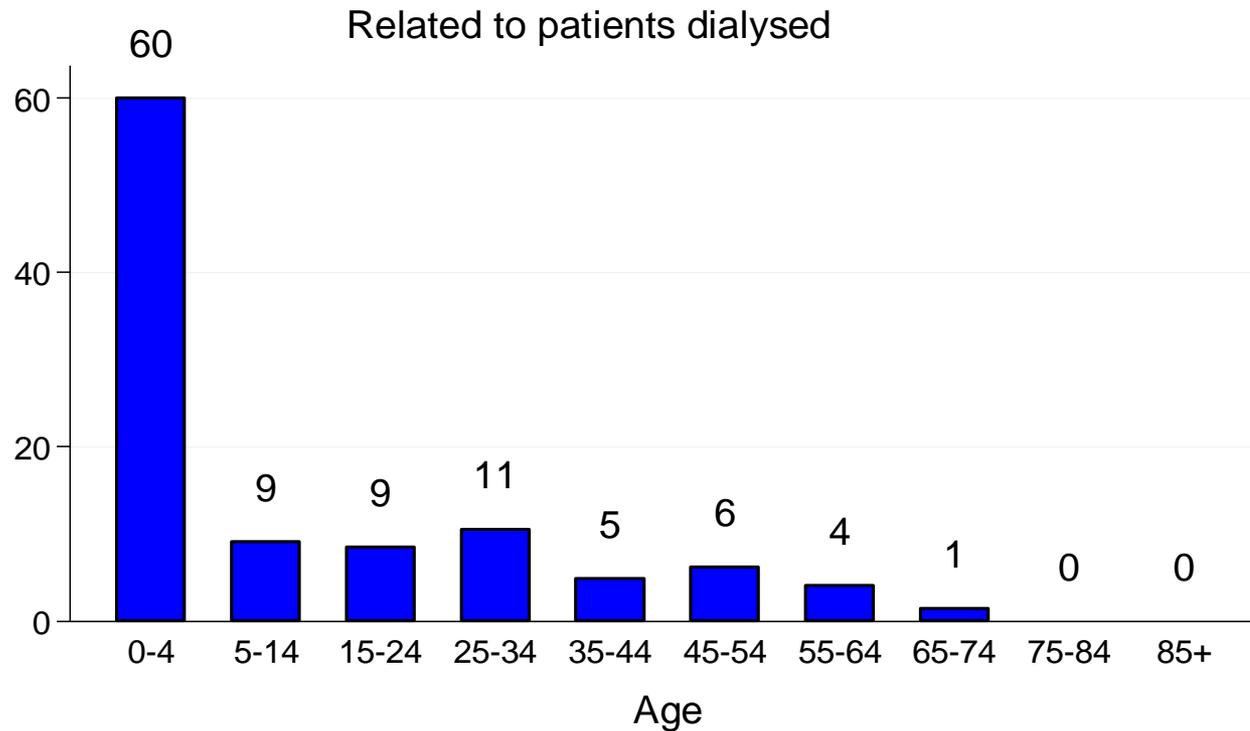


Figure 8.2

Deceased and Living Donor Transplants

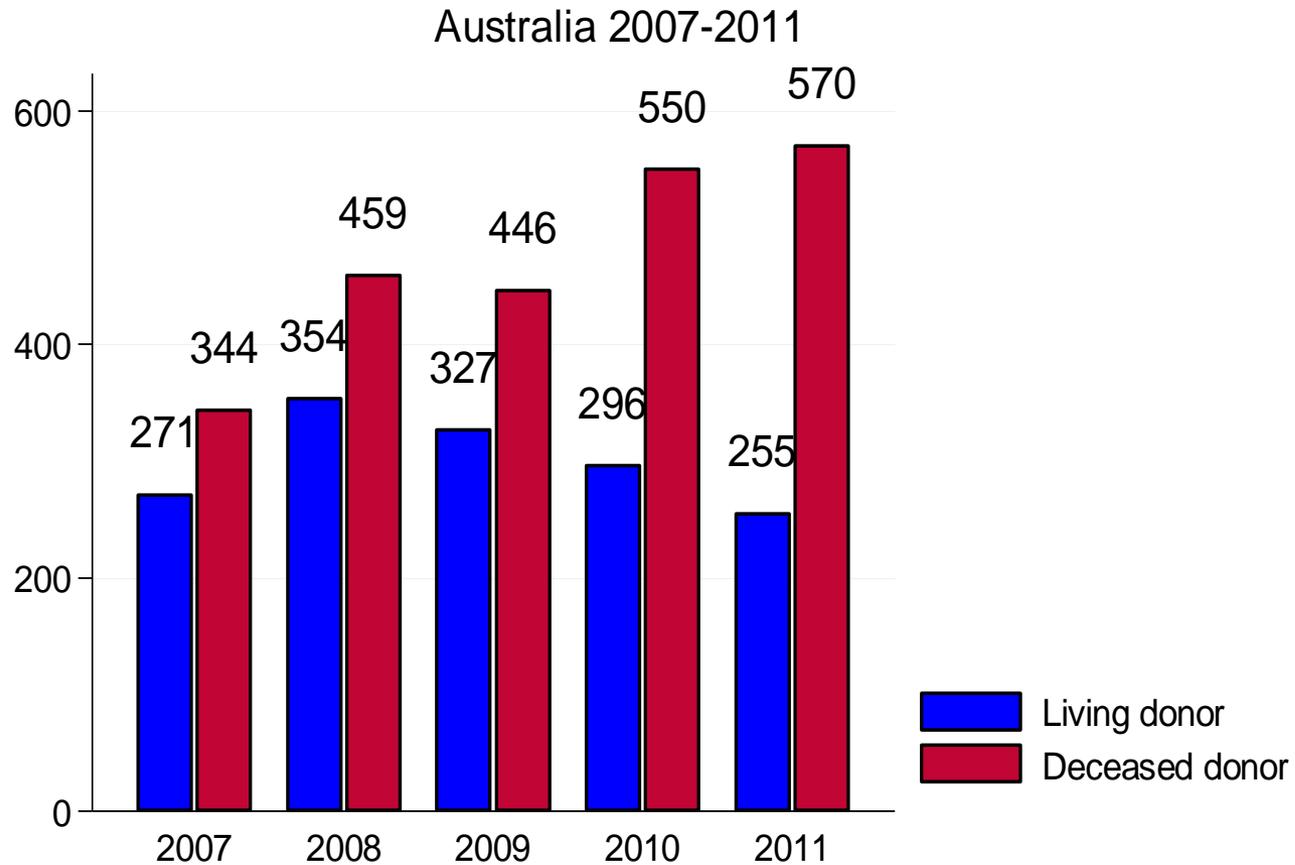


Figure 8.3

Deceased and Living Donor Transplants

New Zealand 2007-2011

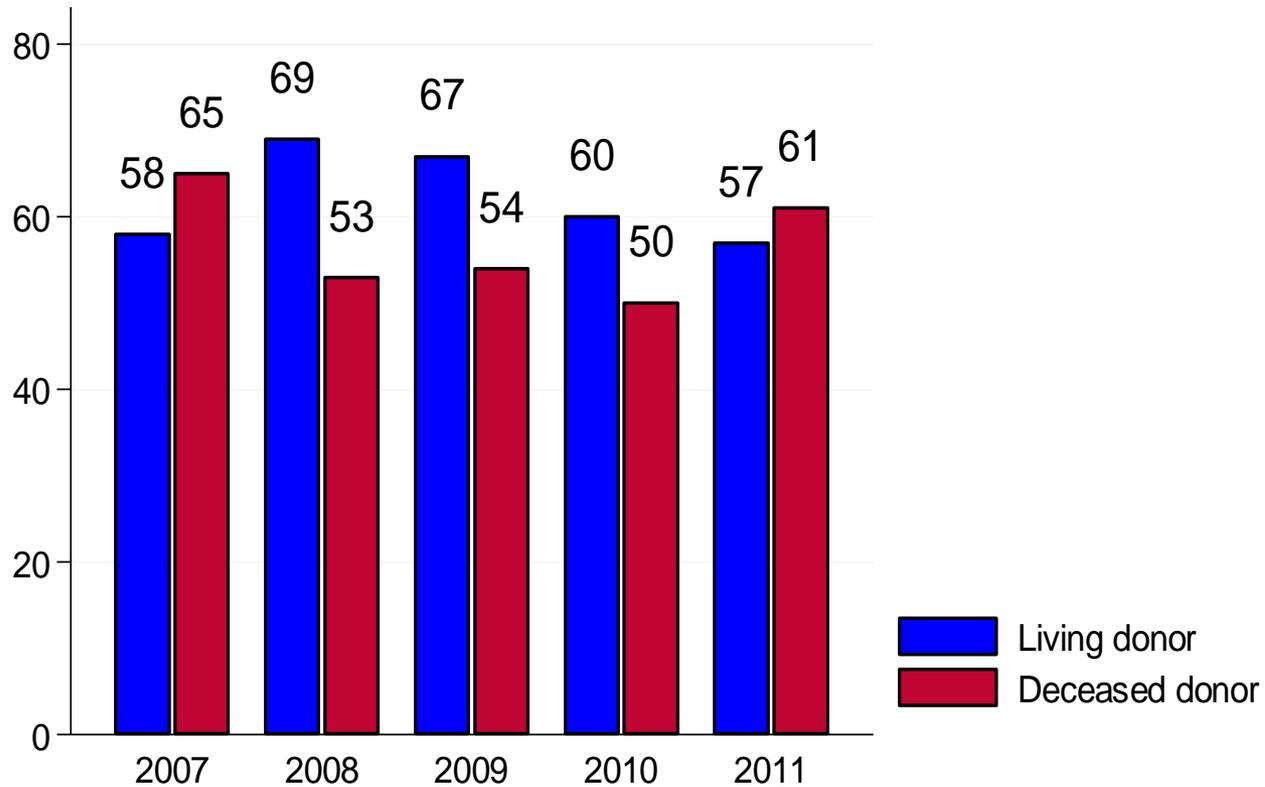


Figure 8.4

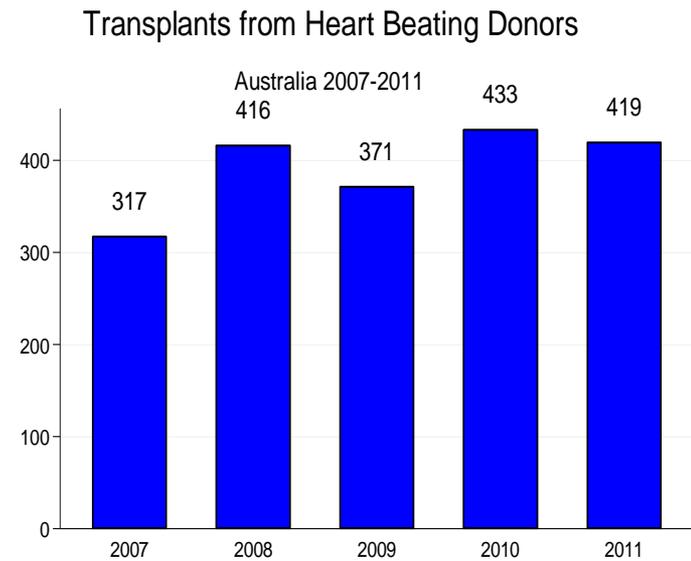
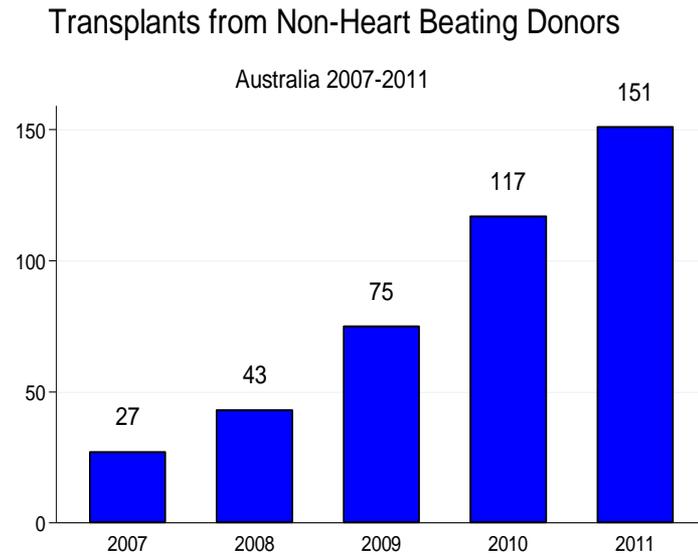
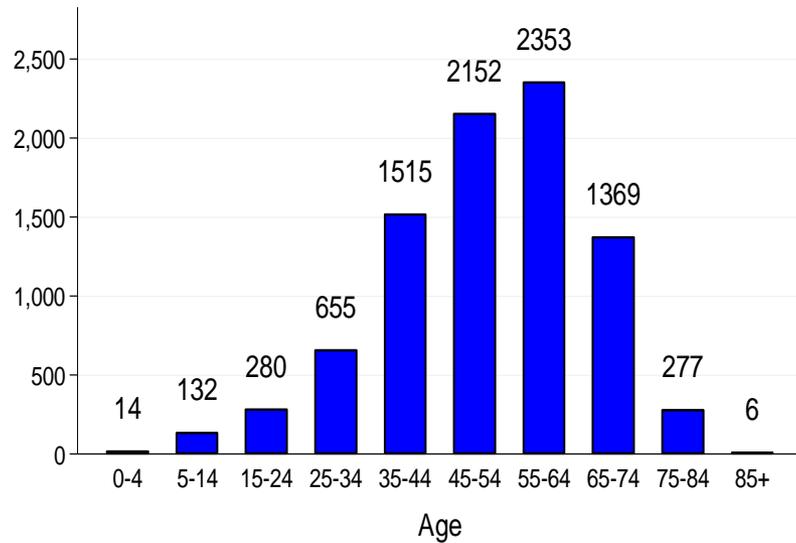


Figure 8.26

Age Distribution of Functioning Transplants

Australia 2011 (n=8753)



Age Distribution of Functioning Transplants

Per million population, Australia 2011

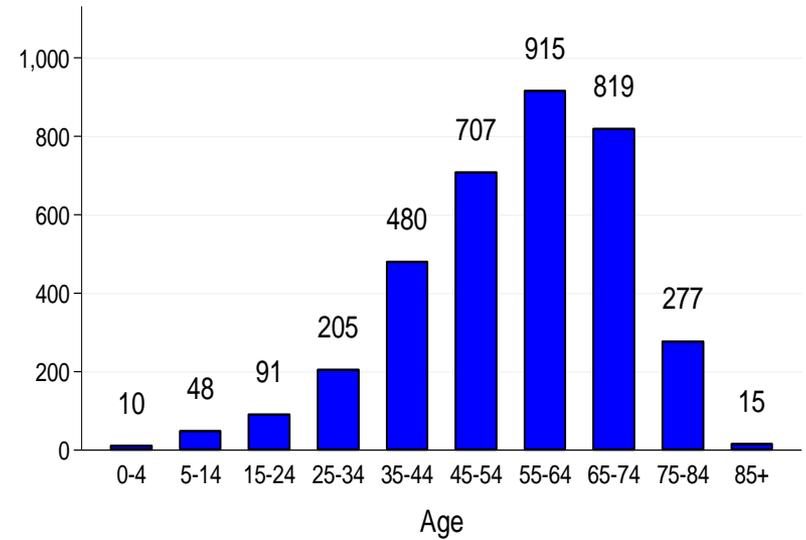
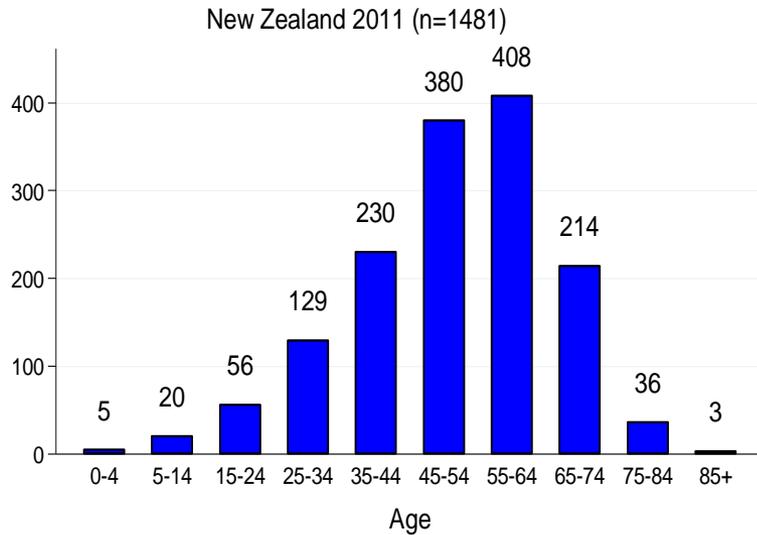


Figure 8.27

Age Distribution of Functioning Transplants



Age Distribution of Functioning Transplants

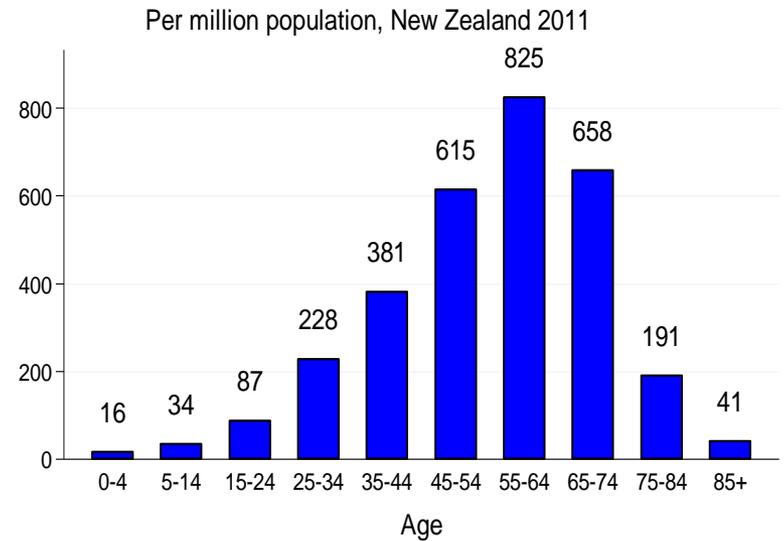


Figure 8.29

Number and Duration of Functioning Grafts

Australia 2011 (n=8753)

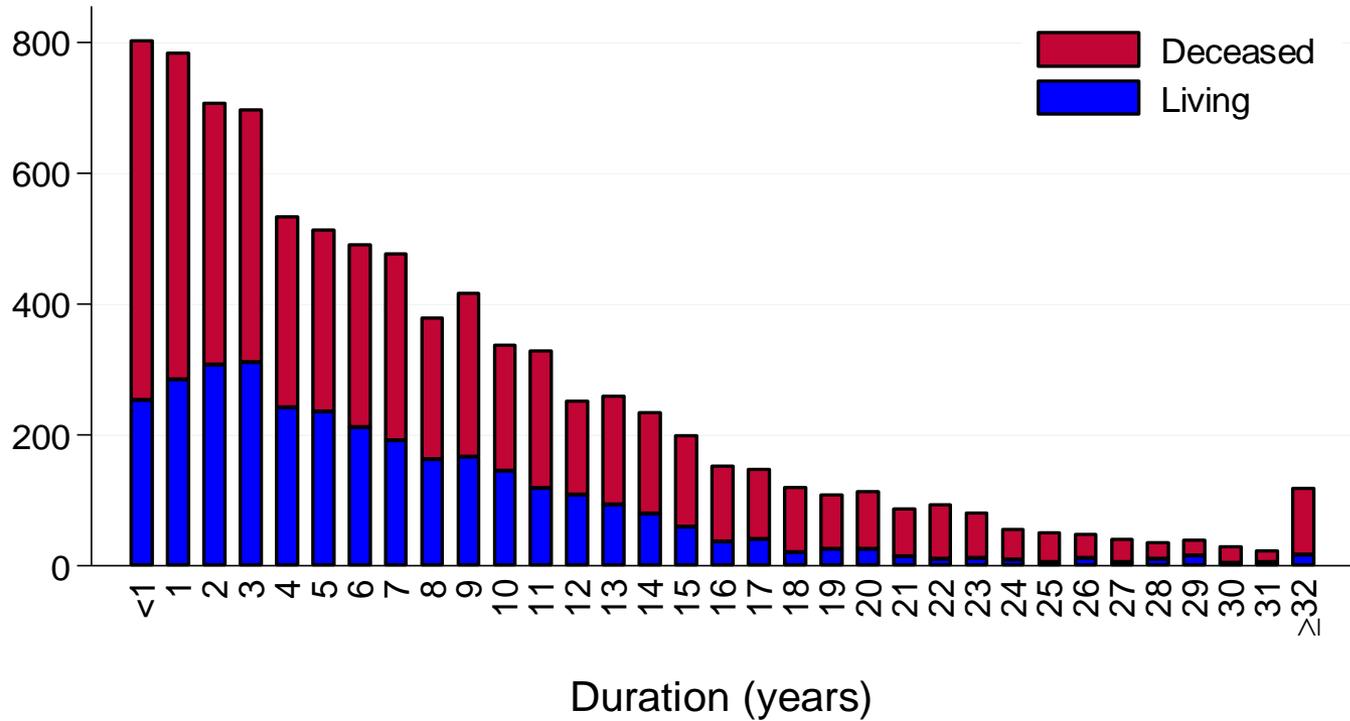
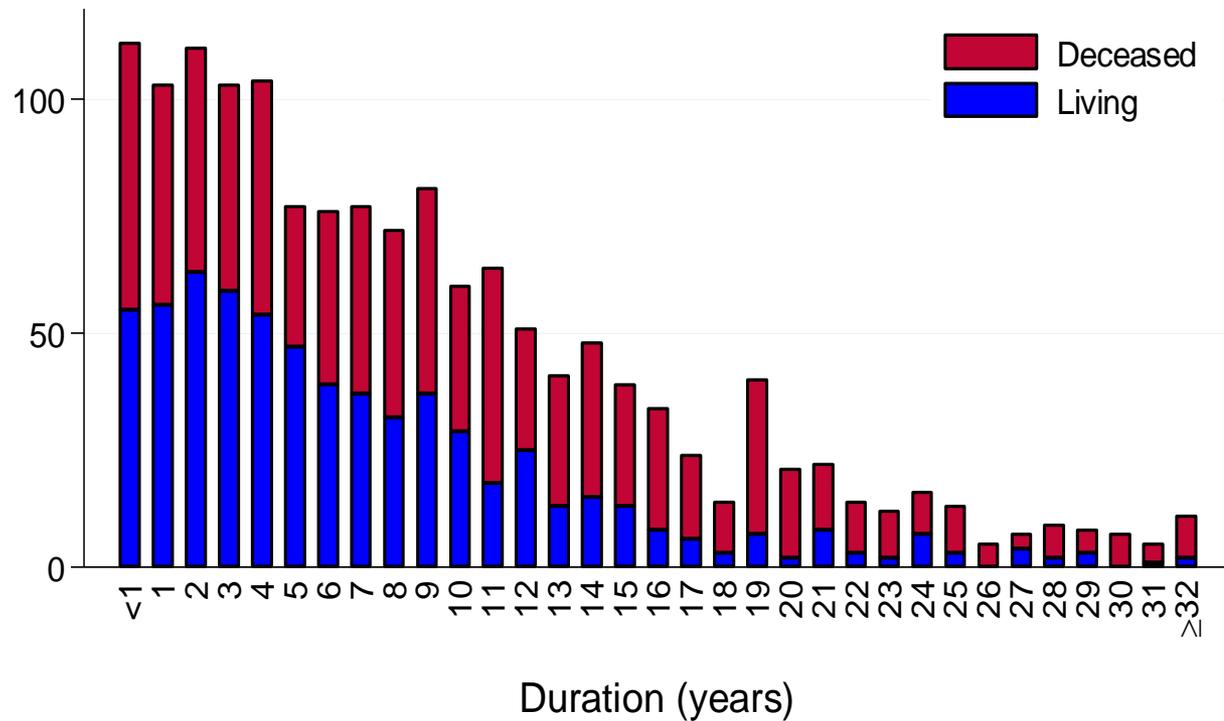


Figure 8.30

Number and Duration of Functioning Grafts

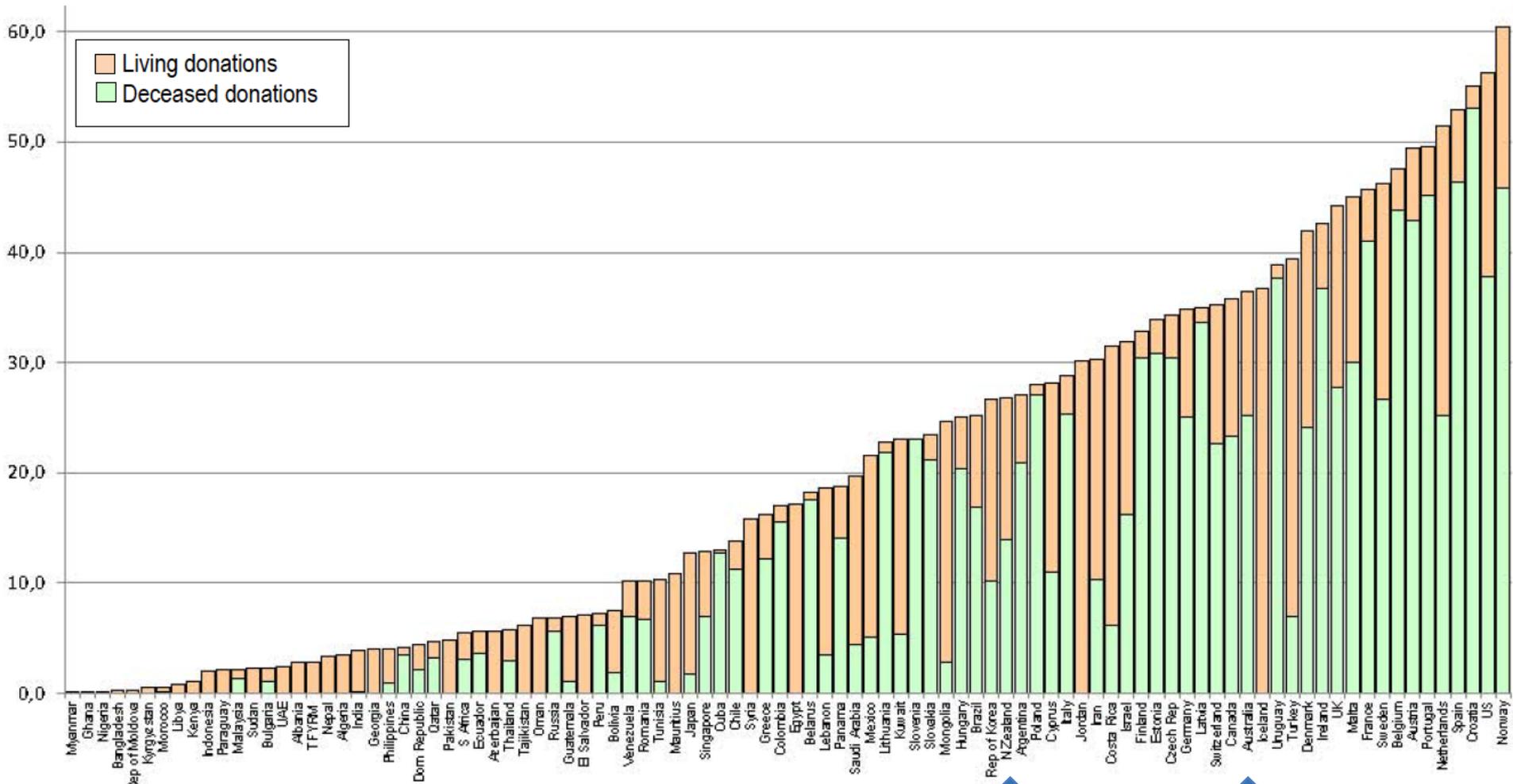
New Zealand 2011 (n=1481)



Overview

- CKD in Australia & NZ
- Transplantation decisions in A & NZ
- Kidney donors

International comparisons

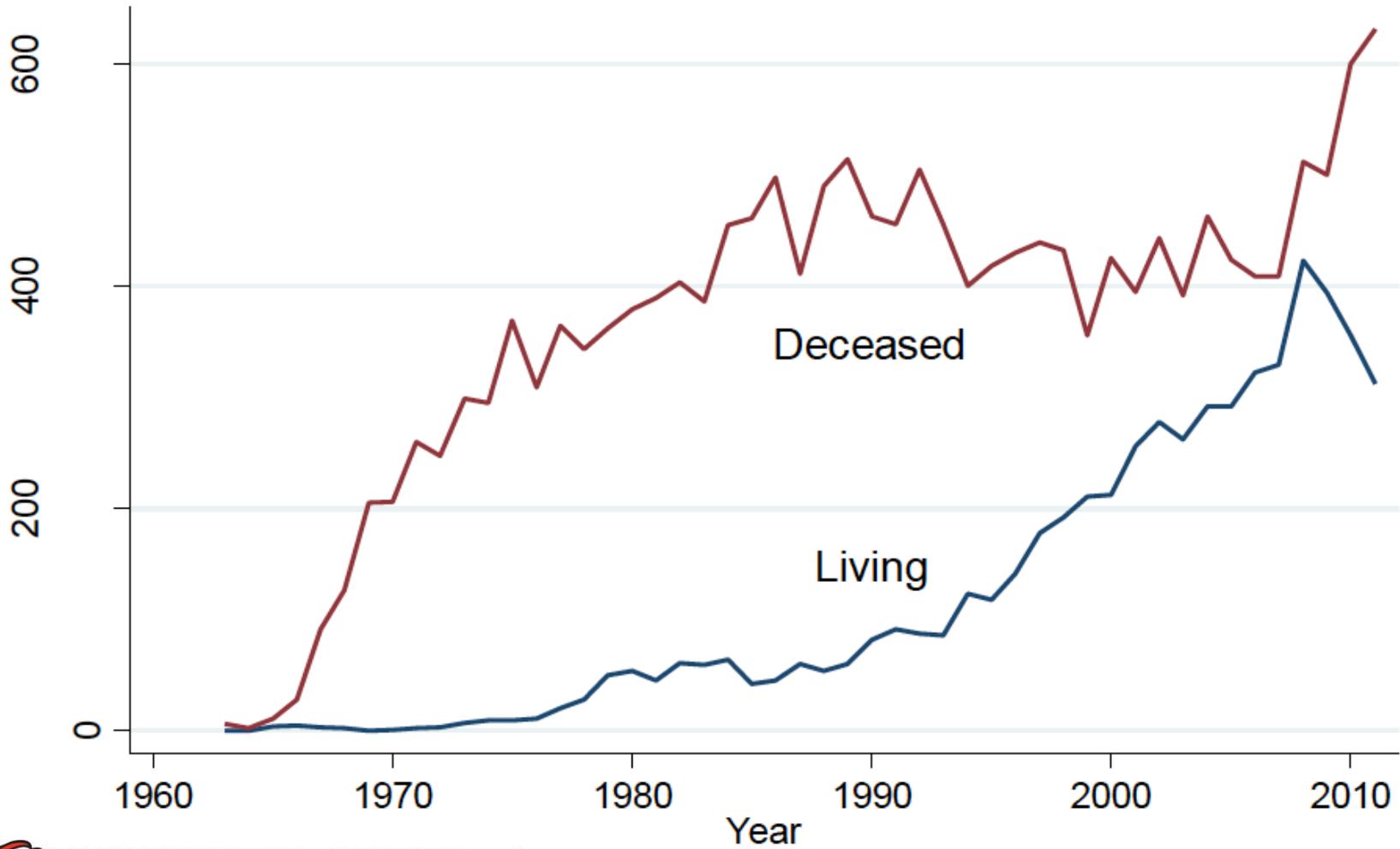


Source: Global Observatory on Donation and Transplantation Organ Donation and Transplantation Activities 2011 (updated 10/7/2013).

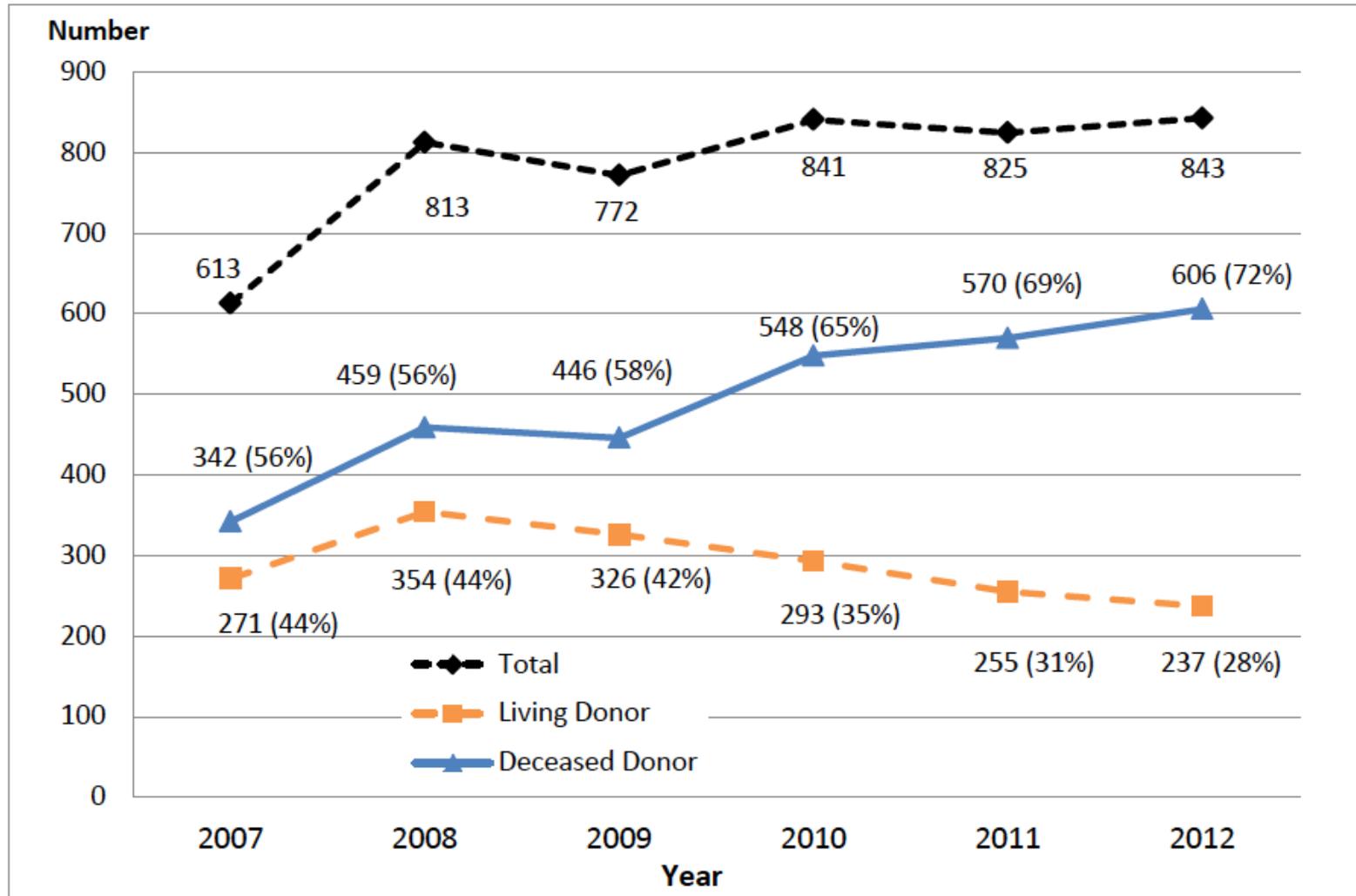


Living and deceased donor transplants

Australia/NZ 1963-2011



Decreased in Living donors

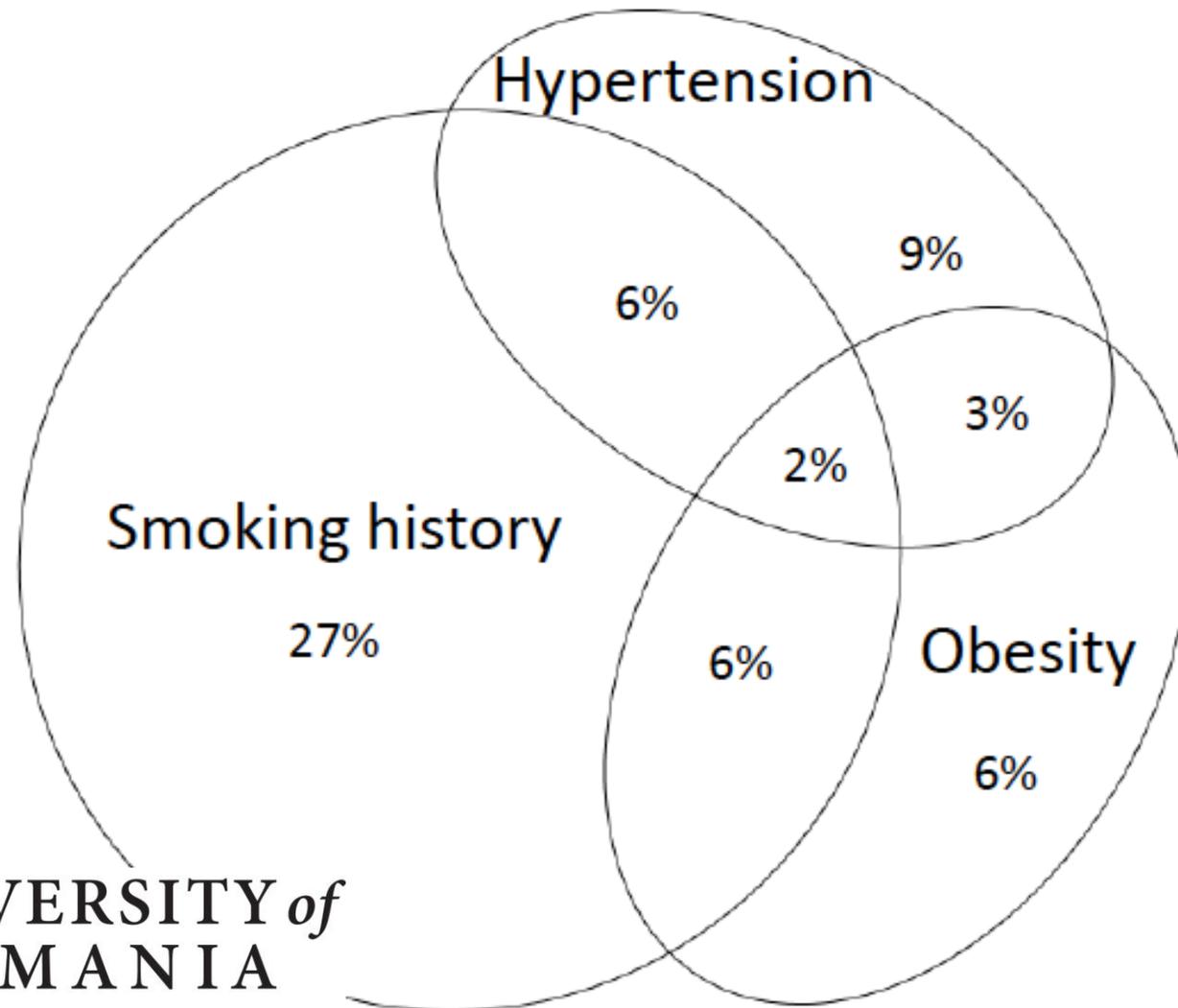


In 2012 there were four live liver donations in Australia, and two in 2011.

Data Source: Australian New Zealand Organ Donor Registry.

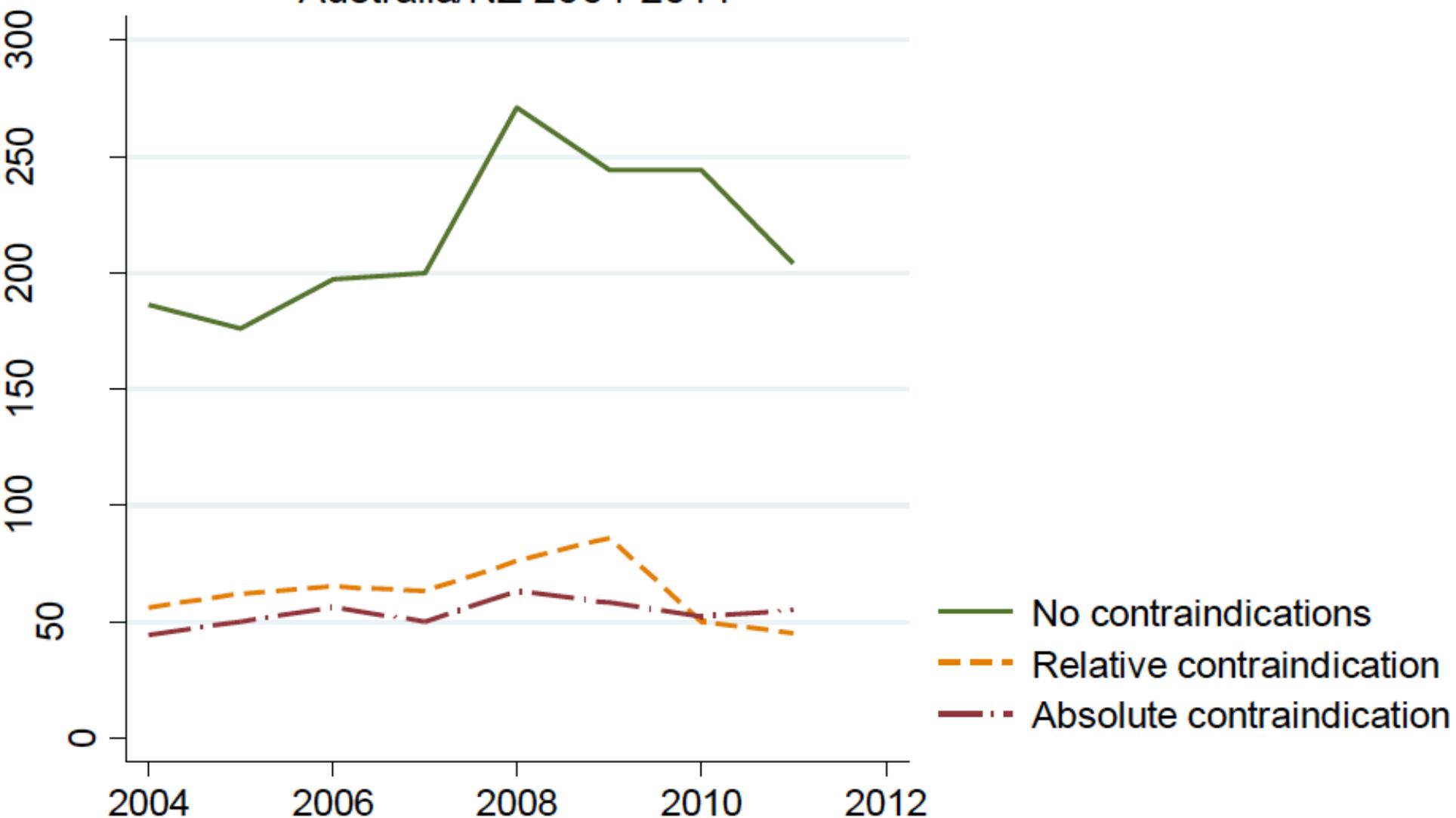


Multiple CVS risk factors



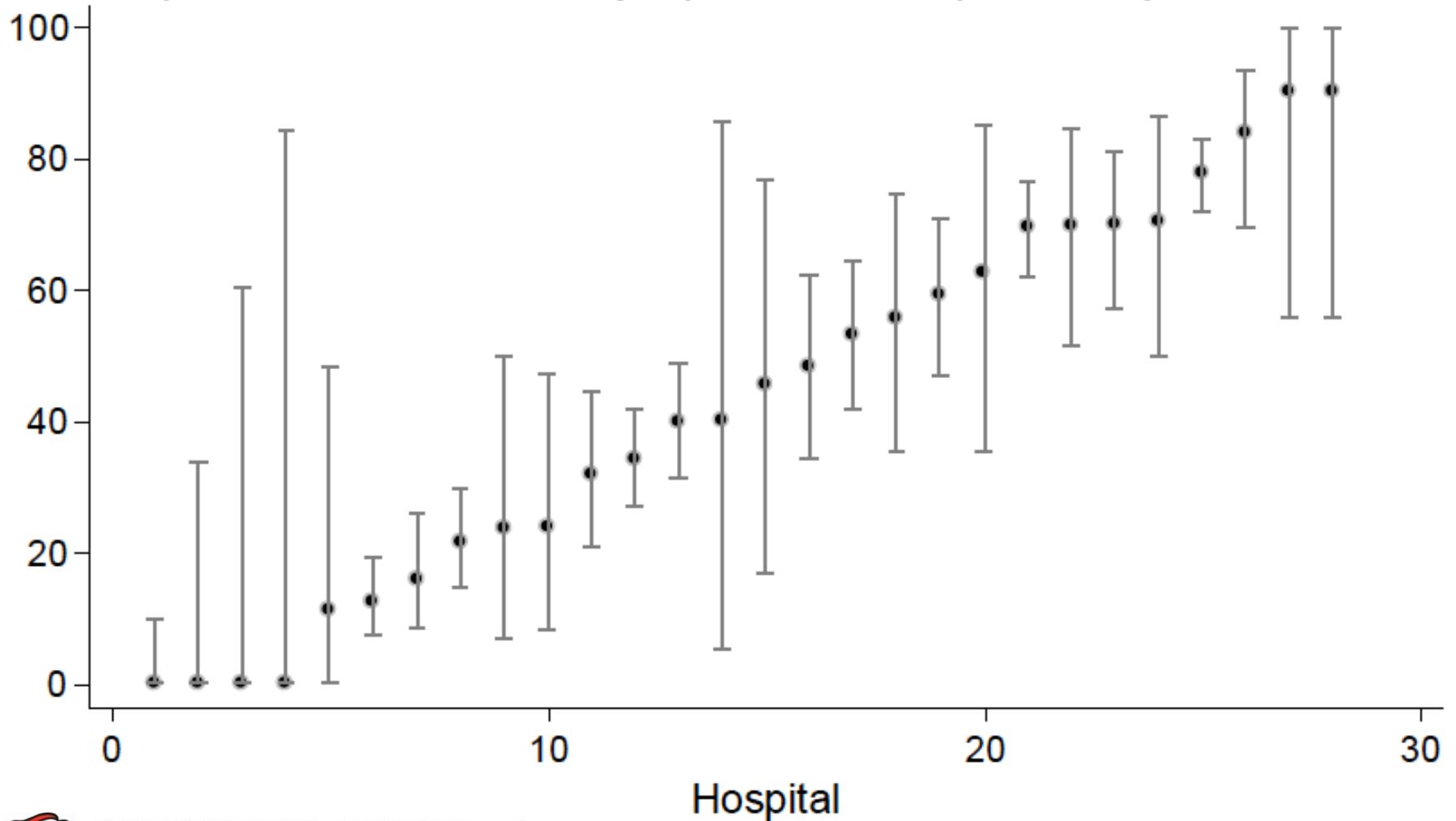
Contraindications to donation according to CARI recommendations

Australia/NZ 2004-2011



Living donor follow-up by transplant hospital 2004-2008

Proportion of donors with any reported follow-up within 3 years of donation



Overview

- CKD in Australia & NZ
- Transplantation decisions in A & NZ
- Kidney donors
- Current immunosuppression

Figure 8.34

Australia

Immunosuppressive Therapy - Primary Deceased Donor Graft 2004 - 2011

	Year	Aza	CyA	Tacrol	MMF	MPA	Sirol	Everolimus	Pred	Number of Deceased Donor Grafts
Initial treatment	2004	6 (2%)	212 (59%)	136 (38%)	309 (85%)	25 (7%)	10 (3%)	1 (<1%)	360 (99%)	362
	2005	9 (3%)	131 (41%)	172 (54%)	299 (94%)	4 (1%)	17 (5%)	-	308 (97%)	319
	2006	-	155 (51%)	139 (45%)	260 (85%)	24 (8%)	3 (1%)	19 (6%)	296 (97%)	306
	2007	2 (1%)	139 (48%)	140 (49%)	244 (85%)	36 (13%)	-	5 (2%)	285 (99%)	287
	2008	2 (1%)	137 (35%)	240 (61%)	364 (93%)	22 (6%)	-	-	389 (99%)	391
	2009	4 (1%)	62 (16%)	310 (82%)	356 (95%)	13 (3%)	-	3 (1%)	375 (100%)	376
	2010	-	66 (14%)	409 (86%)	426 (89%)	37 (8%)	1 (<1%)	3 (1%)	477 (100%)	478
	2011	1 (<1%)	51 (10%)	443 (87%)	309 (60%)	189 (37%)	-	-	498 (97%)	511
Treatment at 12 months	2004	23 (7%)	129 (39%)	162 (49%)	236 (72%)	46 (14%)	31 (9%)	1 (<1%)	304 (93%)	328
	2005	23 (8%)	83 (29%)	172 (59%)	229 (79%)	21 (7%)	29 (10%)	3 (1%)	262 (90%)	291
	2006	12 (4%)	94 (34%)	145 (52%)	216 (78%)	27 (10%)	21 (8%)	20 (7%)	259 (93%)	278
	2007	13 (5%)	86 (32%)	149 (56%)	189 (71%)	51 (19%)	12 (5%)	14 (5%)	252 (95%)	265
	2008	17 (5%)	84 (23%)	251 (70%)	288 (80%)	37 (10%)	12 (3%)	9 (2%)	345 (96%)	361
	2009	18 (5%)	40 (11%)	283 (80%)	282 (80%)	39 (11%)	18 (5%)	9 (3%)	341 (96%)	354
	2010	24 (5%)	51 (11%)	364 (81%)	332 (73%)	65 (14%)	16 (4%)	10 (2%)	430 (95%)	452
Treatment at 24 months	2004	30 (9%)	116 (36%)	154 (48%)	219 (68%)	45 (14%)	41 (13%)	5 (2%)	283 (88%)	320
	2005	23 (8%)	76 (27%)	156 (55%)	220 (78%)	23 (8%)	45 (16%)	5 (2%)	238 (84%)	282
	2006	15 (6%)	81 (30%)	144 (53%)	207 (76%)	31 (11%)	23 (8%)	25 (9%)	248 (92%)	271
	2007	12 (5%)	79 (31%)	152 (59%)	181 (70%)	54 (21%)	14 (5%)	13 (5%)	243 (94%)	259
	2008	20 (6%)	80 (23%)	238 (68%)	275 (79%)	39 (11%)	12 (3%)	9 (3%)	324 (93%)	350
	2009	22 (6%)	36 (10%)	268 (78%)	257 (75%)	43 (13%)	18 (5%)	11 (3%)	322 (94%)	343

Aza = Azathioprine
 CyA = Cyclosporine
 Tacrol = Tacrolimus
 MMF = Mycophenolate Mofetil
 MPA = Mycophenolic Acid (Enteric Coated)
 Sirol = Sirolimus
 Pred = Prednisolone



Figure 8.35

New Zealand

Immunosuppressive Therapy - Primary Deceased Donor Graft 2004 - 2011

	Year	Aza	CyA	Tacrol	MMF	MPA	Sirol	Everolimus	Pred	Number of Deceased Donor Grafts
Initial treatment	2004	-	47 (94%)	3 (6%)	49 (98%)	-	-	-	50 (100%)	50
	2005	-	32 (76%)	8 (19%)	41 (98%)	-	-	-	41 (98%)	42
	2006	-	26 (68%)	11 (30%)	34 (92%)	-	-	3 (8%)	37 (100%)	37
	2007	-	43 (74%)	15 (26%)	57 (98%)	-	-	1 (2%)	58 (100%)	58
	2008	-	30 (67%)	15 (33%)	42 (93%)	3 (7%)	-	-	45 (100%)	45
	2009	-	39 (78%)	10 (20%)	49 (98%)	-	-	-	49 (98%)	50
	2010	-	32 (71%)	13 (29%)	45 (100%)	-	-	-	45 (100%)	45
	2011	-	41 (71%)	17 (29%)	58 (100%)	-	-	-	58 (100%)	58
Treatment at 12 months	2004	9 (19%)	30 (64%)	17 (36%)	37 (79%)	-	-	-	45 (96%)	47
	2005	2 (5%)	21 (55%)	16 (42%)	33 (87%)	1 (3%)	2 (5%)	1 (3%)	35 (92%)	38
	2006	-	18 (53%)	15 (45%)	29 (88%)	-	-	3 (9%)	32 (97%)	33
	2007	3 (6%)	31 (60%)	20 (38%)	43 (83%)	-	2 (4%)	1 (2%)	48 (92%)	52
	2008	2 (5%)	21 (48%)	23 (52%)	39 (89%)	1 (2%)	-	-	41 (93%)	44
	2009	-	24 (50%)	23 (48%)	48 (100%)	-	1 (2%)	-	45 (94%)	48
	2010	2 (5%)	16 (37%)	26 (60%)	40 (93%)	-	-	-	41 (95%)	43
Treatment at 24 months	2004	12 (27%)	27 (60%)	18 (40%)	30 (67%)	-	-	-	41 (91%)	45
	2005	2 (6%)	18 (50%)	17 (47%)	30 (83%)	1 (3%)	2 (6%)	1 (3%)	29 (81%)	36
	2006	-	16 (50%)	16 (50%)	28 (88%)	-	-	2 (6%)	30 (94%)	32
	2007	3 (6%)	29 (58%)	20 (40%)	41 (82%)	-	2 (4%)	1 (2%)	45 (90%)	50
	2008	2 (5%)	20 (48%)	22 (52%)	37 (88%)	-	1 (2%)	-	40 (95%)	42
	2009	-	20 (43%)	24 (52%)	44 (96%)	-	1 (2%)	-	41 (89%)	46

Aza = Azathioprine
 CyA = Cyclosporine
 Tacrol = Tacrolimus
 MMF = Mycophenolate Mofetil
 MPA = Mycophenolic Acid (Enteric Coated)
 Sirol = Sirolimus
 Pred = Prednisolone



Figure 8.36

**Antibody Use for Induction Immunosuppression
Australia and New Zealand 2007 - 2011**

**Number of Kidney Transplant Recipients
Receiving Each Agent by Year
(% Total New Transplants)**

	2007	2008	2009	2010	2011
Australia					
Muromonab-CD3	2 (0.3%)	-	1 (0.1%)	-	-
Intravenous immunoglobulin	14 (2.3%)	25 (3.1%)	28 (3.6%)	39 (4.6%)	40 (4.8%)
Anti-CD25	532 (86.5%)	740 (91.0%)	715 (92.5%)	798 (94.3%)	748 (90.7%)
Rituximab	7 (1.1%)	21 (2.6%)	17 (2.2%)	9 (1.1%)	9 (1.1%)
T cell depleting polyclonal Ab	17 (2.8%)	22 (2.7%)	40 (5.2%)	52 (6.1%)	33 (4.0%)
Total new transplants	615	813	773	846	825
New Zealand					
T cell depleting polyclonal Ab	-	-	-	1 (0.9%)	1 (0.8%)
Anti-CD25	47 (38.2%)	74 (60.7%)	63 (52.1%)	65 (59.1%)	110 (93.2%)
Rituximab	-	1 (0.8%)	2 (1.7%)	1 (0.9%)	3 (2.5%)
Intravenous Immunoglobulin	-	-	-	-	-
Muromonab-CD3	-	-	-	-	-
Total new transplants	123	122	121	110	118



Figure 8.37

**Antibody Use as Treatment for Acute Rejection
Australia and New Zealand 2007 - 2011**

**Number of Kidney Transplant Recipients
Receiving Each Agent by Year
(% Total New Transplants)**

	2007	2008	2009	2010	2011
Australia					
Muromonab-CD3	9 (1.5%)	10 (1.2%)	12 (1.6%)	2 (0.2%)	-
Intravenous immunoglobulin	70 (11.4%)	89 (10.9%)	105 (13.6%)	92 (10.9%)	104 (12.6%)
Anti-CD25	-	1 (0.1%)	1 (0.1%)	-	-
Rituximab	16 (2.6%)	24 (3.0%)	26 (3.4%)	15 (1.8%)	11 (1.3%)
T cell depleting polyclonal Ab	14 (2.3%)	19 (2.3%)	27 (3.5%)	41 (4.8%)	42 (5.1%)
Total new transplants	615	813	773	846	825
Total transplants at risk	7477	7928	8274	8737	9175
New Zealand					
Muromonab-CD3	10 (8.1%)	10 (8.2%)	8 (6.6%)	4 (3.6%)	-
Intravenous immunoglobulin	3 (2.4%)	2 (1.6%)	7 (5.8%)	3 (2.7%)	3 (2.5%)
Anti-CD25	1 (0.8%)	1 (0.8%)	-	-	1 (0.8%)
Rituximab	-	-	3 (2.5%)	-	-
T cell depleting polyclonal Ab	3 (2.4%)	3 (2.5%)	2 (1.7%)	12 (10.9%)	11 (9.3%)
Total new transplants	123	122	121	110	118
Total transplants at risk	1370	1405	1469	1509	1555



Overview

- CKD in Australia & NZ
- Transplantation decisions in A & NZ
- Kidney donors
- Current immunosuppression
- Morbidity & mortality

Figure 8.38

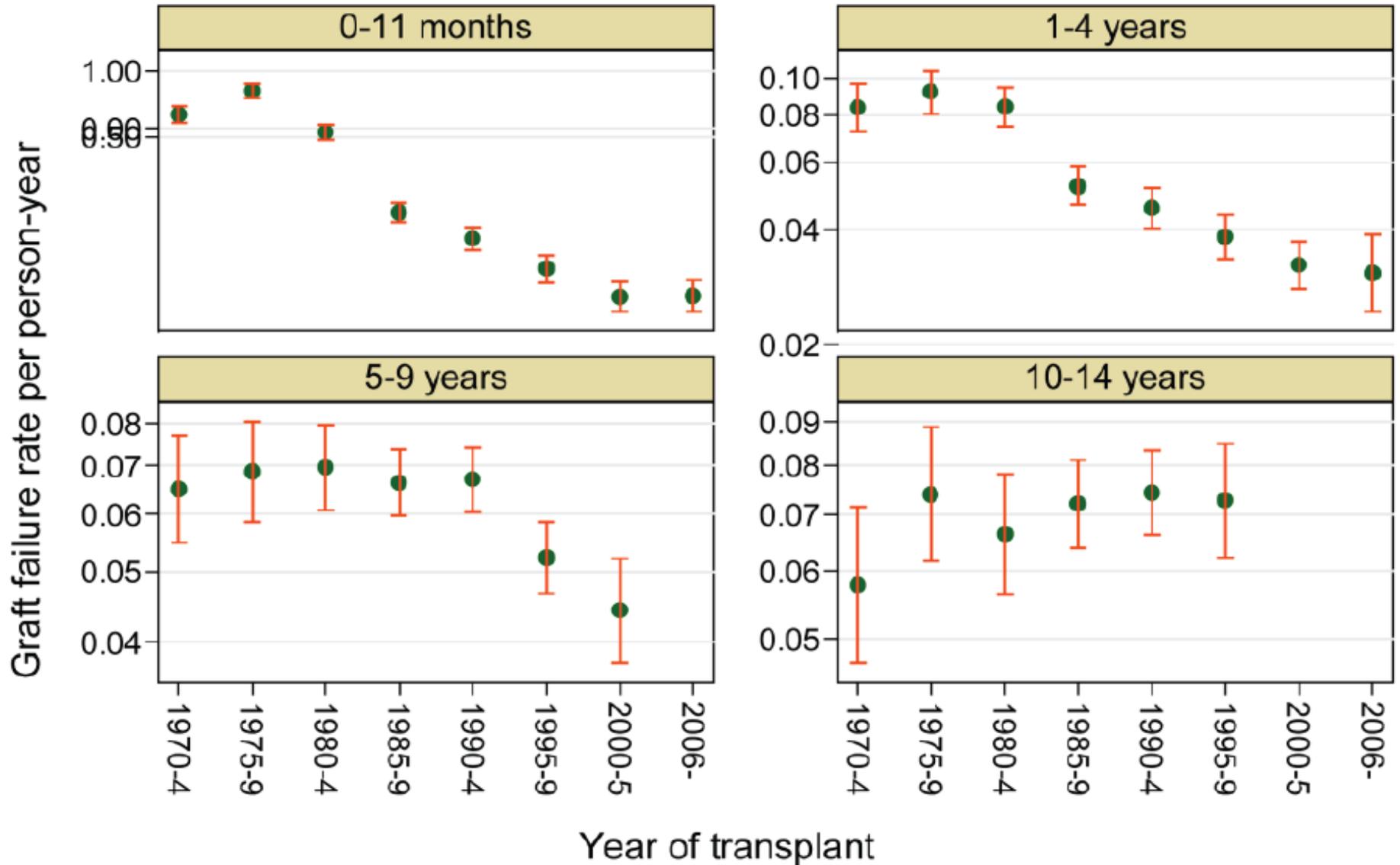
**Australia and New Zealand
Rejection Rates at Six Months Post Transplant**

Donor Source	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Living Donor										
First graft	27.5%	27.7%	21.6%	19.6%	19.6%	21.1%	17.0%	16.8%	17.8%	16.1%
Second and subsequent grafts	13.0%	33.3%	34.8%	18.5%	33.3%	34.3%	30.0%	24.3%	12.9%	18.5%
Deceased Donor										
First graft	22.9%	26.8%	22.8%	18.6%	16.3%	17.7%	22.0%	20.9%	18.7%	17.9%
Second and subsequent grafts	24.1%	25.0%	27.5%	31.7%	36.4%	32.8%	32.9%	36.5%	27.3%	16.1%

Figure 8.31**Graft Loss Rate 2002 - 2011**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Australia	6113	6327	6656	6918	7189	7477	7928	8274	8737	9175
Death with Function	2.3%	2.3%	2.2%	2.4%	2.0%	2.2%	2.2%	1.8%	2.0%	2.2%
Loss of Graft Function	2.9%	2.7%	3.1%	2.8%	2.5%	2.5%	2.9%	2.8%	2.3%	2.3%
All Losses	5.2%	4.9%	5.3%	5.1%	4.5%	4.7%	5.1%	4.5%	4.3%	4.5%
New Zealand	1180	1227	1273	1314	1329	1370	1405	1469	1509	1555
Death with Function	2.7%	2.2%	2.2%	2.3%	2.6%	3.2%	1.9%	2.3%	2.3%	2.6%
Loss of Graft Function	2.7%	2.5%	1.8%	3.3%	3.5%	2.9%	2.1%	2.4%	2.1%	2.0%
All Losses	5.4%	4.7%	4.0%	5.6%	6.0%	6.1%	3.9%	4.7%	4.4%	4.6%

Graft failure rate over time



ANZDATA, all Australia & NZ grafts, to 12/2009

Figure 4. Graft survival in Australia and New Zealand from the 1960s to today. Short-term, medium-term and long-term graft survival in Australia and New Zealand from the 1960s to today. Reproduced with permission from [4].

Figure 8.32**Year of Graft Loss Due to Death or Failure 2002 - 2011**

Loss	Cause of Failure	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Australia												
Failed	Death with Function	138	144	144	163	144	162	172	146	171	201	1585
	Rejection - Acute	8	3	5	3	7	11	10	16	8	10	81
	Chronic Allograft (CAN)	108	113	143	134	105	131	172	151	145	144	1346
	Rejection - Hyperacute	-	-	-	-	1	-	2	-	-	-	3
	Vascular	16	15	18	13	14	8	14	17	11	6	132
	Technical Problems	3	3	2	4	5	2	4	3	3	3	32
	Glomerulonephritis	15	12	13	16	23	15	9	15	14	15	147
	Non Compliance	11	10	8	6	3	8	6	12	6	6	76
	Other	16	13	19	15	19	15	16	14	18	31	176
Total		315	313	352	354	321	352	405	374	376	416	3578
New Zealand												
Failed	Death with Function	32	27	28	30	34	44	26	34	34	41	330
	Rejection - Acute	1	1	-	2	2	1	1	1	-	3	12
	Chronic Allograft (CAN)	22	16	15	24	31	21	20	29	17	14	209
	Rejection - Hyperacute	-	-	1	-	-	-	-	-	-	-	1
	Vascular	1	1	-	4	-	3	1	2	3	2	17
	Technical Problems	1	2	-	2	3	1	-	-	-	-	9
	Glomerulonephritis	1	4	2	3	6	4	5	-	5	4	34
	Non Compliance	3	3	1	1	1	6	1	1	5	3	25
	Other	3	4	4	8	4	4	1	2	2	5	37
Total		64	58	51	74	81	84	55	69	66	72	674



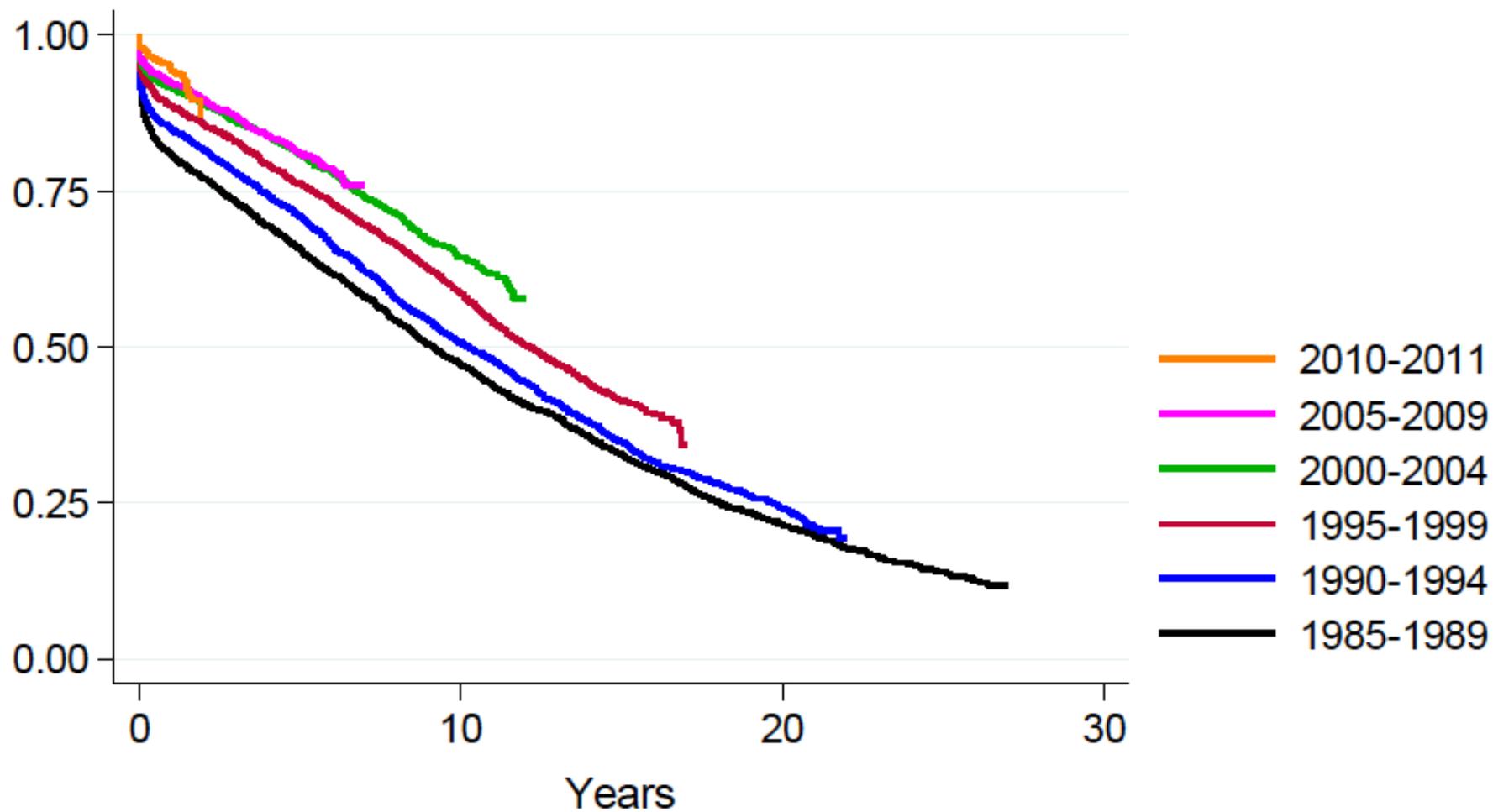
Figure 8.33

Graft Losses 2007 - 2011						
Cause of Loss	Australia			New Zealand		
	Graft Function			Graft Function		
	<1 year	>= 1 year	Any Time	<1 year	>= 1 year	Any Time
Death with functioning Graft						
Cardiac	21 (30%)	191 (24%)	212 (25%)	4 (36%)	47 (28%)	51 (28%)
Vascular	5 (7%)	70 (9%)	75 (9%)	1 (9%)	7 (4%)	8 (4%)
Infection	29 (42%)	130 (17%)	159 (19%)	1 (9%)	27 (16%)	28 (16%)
Social	3 (4%)	53 (7%)	56 (7%)	1 (9%)	8 (5%)	9 (5%)
Malignancy	5 (7%)	262 (33%)	267 (31%)	3 (27%)	60 (36%)	63 (35%)
Miscellaneous	6 (9%)	77 (10%)	83 (10%)	1 (9%)	19 (11%)	20 (11%)
Total	69 (100%)	783 (100%)	852 (100%)	11 (100%)	168 (100%)	179 (100%)
Graft Failure						
Rejection - Acute	30 (23%)	25 (3%)	55 (5%)	-	6 (4%)	6 (4%)
Rejection - Chronic Allograft (CAN)	9 (7%)	734 (78%)	743 (69%)	1 (6%)	100 (67%)	101 (60%)
Rejection - Hyperacute	2 (2%)	-	2 (<1%)	-	-	-
Vascular	41 (31%)	15 (2%)	56 (5%)	8 (44%)	3 (2%)	11 (7%)
Technical Problems	10 (8%)	5 (1%)	15 (1%)	1 (6%)	-	1 (1%)
Glomerulonephritis	9 (7%)	59 (6%)	68 (6%)	3 (17%)	15 (10%)	18 (11%)
Non Compliance	1 (1%)	37 (4%)	38 (4%)	1 (6%)	15 (10%)	16 (10%)
Other	30 (23%)	64 (7%)	94 (9%)	4 (22%)	10 (7%)	14 (8%)
Total	132 (100%)	939 (100%)	1071 (100%)	18 (100%)	149 (100%)	167 (100%)



Primary Deceased Donor Grafts

Graft survival - Australia and New Zealand





Transplantation in Australia And New Zealand

- CKD in Australia & NZ
- Transplantation decisions in A & NZ
- Kidney donors
- Current immunosuppression
- Morbidity & mortality
- Questions





Transplantation in Australia And New Zealand

