

2014

***Australian and New Zealand
Organ Donor Registry***



Annual Report

**Address:**

C/- Royal Adelaide Hospital
DX800 MP117
Level 9, East Wing
North Terrace
Adelaide
South Australia 5000

Phone:

(08) 8222 0949
(08) 8222 0951

Fax:

(08) 8222 0995
(08) 8222 0985

Email:

anzdata@anzdata.org.au
requests@anzdata.org.au

Web:

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

Executive:**Chair of Executive**

Professor Graeme Russ

Registry Manager

Mrs Kylie Hurst

Editor

Ms Violet Marion

ANZOD Advisory Committee: (representatives of)

Australian Organ and Tissue Authority
Australian Transplant Coordinators Association
New Zealand Organ Donation Coordinators
Transplant Society of Australia and New Zealand
Australian National Organ Matching System
Australian and New Zealand Dialysis and Transplantation Registry
Australian and New Zealand Liver transplant Registry
Australia and New Zealand Cardiothoracic Transplant Registry
National Pancreas and Islets Transplant Registry
Consumer (Organ Donor Family)

Registry Staff:**Clinical Epidemiologist**

Dr Philip Clayton

Post-Doctoral Research Fellow

Dr Blair Grace

Biostatisticians

Dr Nancy Briggs
Ms Aarti Gulyani
Ms Hannah Dent
Dr Stuart Howell

Date Systems Manager

Ms Maneesha Kandamby

Senior Project Officer

Ms Lauren Bell

Administrative Support Officers

Ms Christina Leitch
Ms Brooke Martin
Ms Melanie Steventon

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Contents

Contents	Page
Acknowledgements	vi
Forward	vii
Transplant Regions and Centres	viii
History of ANZOD	xi
Data Collection Form	xii
Methods	xiv
Publications	xv
Chapter 1 Organ Donation in Australia and New Zealand	1-1
Overview of Organ Donation	1-2
Number of Donors by Retrieval State / Country 2008-2012	1-2
Number of Donors Australian States 1998-2012	1-3
Number of Donors Per Million Population Australian States 2008-2012	1-3
Number of Donors Per 10,000 Deaths Australian States 2002-2011	1-4
Donors Per 10,000 Deaths Aged < 75 years 2007-2011	1-4
Total Number of Donors, Organs and Recipients Per Million Population, Australia.	1-5
Type of Organ Donor Australia, 1998-2012	1-5
Australia and New Zealand Overview	1-6
Number of Transplanted Organs Donated by State & Country of Donation	1-7
Number of Organs Transplanted Per Donor 2004-2012	1-7
Organs Transplanted Per Million Population & from DCD Donors	1-8
Location of Postcodes of Deceased Donors 2008-2012	1-9
Chapter 2 International Data	2-1
International Deceased Organ Donor Rates (Per Million Population)	2-1
International Kidney Transplantation from Deceased Donors (Per Million Population)	2-5
International Liver Transplantation from Deceased Donors (Per Million Population)	2-7
International Heart Transplantation from Deceased Donors (Per Million Population)	2-9
International Lung Transplantation from Deceased Donors (Per Million Population)	2-11
International Pancreas Transplantation from Deceased Donors (Per Million Population)	2-13
Chapter 3 Pathway of Organ Donation in Australia and New Zealand	3-1
Donor Intention	3-2
Coroner's Cases	3-3
Cause of Death - All Donors	3-4
Cardiopulmonary Resuscitation	3-6
Authority Sought for Organ Donation	3-7
Donation Not Proceeding	3-8
Donation After Circulatory Death	3-9
Time From Admission to Brain Death	3-10
Time From Ventilation to Brain Death	3-11
Time From Brain Death to Aortic Cross Clamp	3-12
Donor Maintenance	3-13
Terminal Treatment	3-13
Summary—Organs Requested, Consent Given, Retrieved & Transplanted	3-14
Organs Requested	3-14
Organs Retrieved	3-15
Multiple Organ Retrieval	3-15
Chapter 4 Donor Profile	4-2
Demographics of Deceased Donors in Australia 2011-2012	4-2
Demographics of Deceased Donors in New Zealand 2011-2012	4-3
Age and Gender Distribution in Australia and New Zealand	4-4
Australia	4-5
New Zealand	4-5
Ethnic Origin of Donors 2009-2013	4-10
Religious Denomination of Donors 2009—2013	4-10
Donor Weight	4-11

Contents



Chapter 4 (cont)								Page
	Medical Condition of Donors	.	.	.	.	.	.	4-12
	Diabetes	.	.	.	.	.	.	4-12
	Hypertension	.	.	.	.	.	.	4-12
	Smoking	.	.	.	.	.	.	4-13
	Cancer	.	.	.	.	.	.	4-13
	New Zealand	.	.	.	.	.	.	4-13
	Virology Screening	.	.	.	.	.	.	4-14
	Hepatitis C Antibody	.	.	.	.	.	.	4-14
	Hepatitis B Core Antibody	.	.	.	.	.	.	4-15
Chapter 5	Organ Data	.	.	.	.	.	.	5-1
	Kidney Donation	.	.	.	.	.	.	5-2
	Age of Kidney Donors	.	.	.	.	.	.	5-5
	Donor Kidney Biopsy	.	.	.	.	.	.	5-5
	Liver Donation	.	.	.	.	.	.	5-6
	Age of Liver Donors	.	.	.	.	.	.	5-9
	Donor Liver Function	.	.	.	.	.	.	5-9
	Heart Donation	.	.	.	.	.	.	5-10
	Age of Heart Donors	.	.	.	.	.	.	5-12
	ECG and Echocardiogram	.	.	.	.	.	.	5-12
	Lung Donation	.	.	.	.	.	.	5-14
	Outcome of Lung Request	.	.	.	.	.	.	5-14
	Age of Lung Donors	.	.	.	.	.	.	5-16
	Donor Lung Function	.	.	.	.	.	.	5-16
	Pancreas Donation	.	.	.	.	.	.	5-17
	Age of Pancreas Donors	.	.	.	.	.	.	5-20
	Pancreas Islets Donation	.	.	.	.	.	.	5-20
	Intestine Donation	.	.	.	.	.	.	5-21
Chapter 6	Tissue & Eye Data	.	.	.	.	.	.	6-1
	Tissue & Eye Donors	.	.	.	.	.	.	6-3
	Tissue Donation	.	.	.	.	.	.	6-4
	Outcome of Request for Tissue Donation	.	.	.	.	.	.	6-6
	Age of tissue Donors	.	.	.	.	.	.	6-8
Chapter 7	Organ Waiting Lists in Australia and New Zealand	.	.	.	.	.	.	7-1
	Kidneys	.	.	.	.	.	.	7-3
	Liver	.	.	.	.	.	.	7-4
	Cardiothoracic Organs	.	.	.	.	.	.	7-5
	Pancreas	.	.	.	.	.	.	7-6
Chapter 8	Organ Donation Outcome Data in Australia and New Zealand	.	.	.	.	.	.	8-1
	Graft Survival	.	.	.	.	.	.	8-2
Chapter 9	Glossary of Terms	.	.	.	.	.	.	9-1
Supplement 1	Australia	.	.	.	.	.	.	S-1-1
Supplement 2	New Zealand	.	.	.	.	.	.	S-2-1



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We would like to also acknowledge the ongoing financial commitment of the Australian Organ and Tissue Authority, the New Zealand Ministry of Health and Kidney Health Australia.

Forward



We are pleased to present the 2014 report of the Australia and New Zealand Organ Donation Registry (ANZOD Registry). The Registry continues to be a collaborative effort of the Australasian Transplant Coordinators Association, the DonateLife Network and the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA).

This report contains data for the year 2013, as well as cumulative data from Australia since 1989 and New Zealand from 1993 on data for deceased organ donors.

The Registry in 2013 undertook a project to improve the ability for data capture. With the employment of an additional Senior Project Officer, the data management system underwent a complete rebuild and a web based application was developed for the ability to receive data electronically. In conjunction with the Organ and Tissue Authority of Australia and its DonateLife Network, data will be uploaded electronically from the Electronic Donor Record in 2014.

The 2014 report also includes the expansion of reporting in eye and tissue and acknowledges the collaboration of the eye and tissue banks across Australia.

We would like to thank Kylie Hurst, Registry Manager for her continued dedicated efforts in advancing the Registry operations and managing the expanding projects within the solid organ and eye and tissue donation sector.

The Registry gratefully acknowledges the funding from the Australian Organ and Tissue Donation Authority, the New Zealand Ministry of Health and Kidney Health Australia.

The report can be accessed via our website www.anzdata.org.au

Graeme Russ

Chair ANZOD Executive and Advisory Committee



Transplant Regions and Centres

QUEENSLAND

ORGAN DONOR COORDINATORS

Megan Fletcher
Cheryl Fourie
Angela McInnes
Francesca Rourke
Bianca Topp

HEART AND LUNG TRANSPLANT CENTRE

Prince Charles Hospital, Rode Road, Chermside 4032

RENAL TRANSPLANT CENTRE

Princess Alexandra Hospital, Ipswich Road,
Woolloongabba 4102

LIVER TRANSPLANT CENTRES

Princess Alexandra Hospital, Ipswich Road,
Woolloongabba 4102

Royal Children's Hospital, Bowen Bridge Road,
Herston 4029

NEW SOUTH WALES / AUSTRALIAN CAPITAL TERRITORY

ORGAN DONOR COORDINATORS

Carrie Alvaro
Hazel Christine
Alice Coulson
Malcolm Green
Adam Roshan
Nicola Seifert
Sandra Thompson

HEART AND LUNG TRANSPLANT CENTRE

St Vincent's Hospital, Victoria Street, Darlinghurst
2010

AUSTRALIAN NATIONAL LIVER TRANSPLANT CENTRES

The Children's Hospital at Westmead, Hawkesbury
Road, Westmead 2145

Royal Prince Alfred Hospital, Missenden Road,
Camperdown 2050

NATIONAL PANCREAS TRANSPLANT CENTRE

Dept. Renal Medicine, Westmead Hospital, Cnr
Hawkesbury and Darcy Road, Westmead 2145

RENAL TRANSPLANT CENTRES

The Children's Hospital at Westmead, Hainsworth
Street, Westmead 2145

John Hunter Hospital, Lookout Road, New Lambton
Heights, Newcastle 2305

Prince of Wales Hospital, Barker Street, Randwick
2031

Sydney Children's Hospital, High Street, Randwick
2031

Royal North Shore Hospital, Pacific Highway, St
Leonards 2065

Statewide Renal Services (Royal Prince Alfred
Hospital), Missenden Road, Camperdown 2050

St Vincent's Hospital, Victoria Street, Darlinghurst
2010

Westmead Hospital, Cnr Hawkesbury and Darcy
Road, Westmead 2145



Transplant Regions and Centres

VICTORIA / TASMANIA

ORGAN DONOR COORDINATORS

Sarah Aranha
Bettina Clark
Victoria Dale
Espedito Faraone
Hayley Furniss
Nicole Gauthie
Nina Klein
Paula Lyons
Violet Marion
Nora O'Connor
Jo Sanders
Elizabeth Treasure
Andrew Young

HEART AND LUNG TRANSPLANT CENTRES

Royal Children's Hospital, Flemington Road, Parkville 3052
The Alfred Hospital, Commercial Road, Prahran 3181

NATIONAL PANCREAS TRANSPLANT CENTRE (VICTORIA)
Monash Medical Centre, 246 Clayton Road, Clayton 3168

RENAL TRANSPLANT CENTRES

Alfred Hospital, Commercial Road, Prahran 3181

Austin Hospital, Austin Health, 145 Studley Road, Heidelberg 3084

Monash Medical Centre (Paediatric & Adult), 246 Clayton Road, Clayton 3168

Royal Children's Hospital, Flemington Road, Parkville 3052

The Royal Melbourne Hospital, Grattan Street, Parkville 3052

St Vincent's Hospital, 41 Victoria Parade, Fitzroy 3065

LIVER TRANSPLANT CENTRES

Austin Hospital, Austin Health, 145 Studley Road, Heidelberg 3084

Royal Children's Hospital, Flemington Road, Parkville 3052

SOUTH AUSTRALIA

ORGAN DONOR COORDINATORS

Renee Chambers
Catherine Hannan
Kathy Hee
Philippa Jones
Heylen Laver
James McCance
Daniel Medlicott
Stephen Orr
Nigel Palk
Danila Peake
Lesley Sheffield
Penny Wride

RENAL TRANSPLANT CENTRES

Central Northern Adelaide Renal Transplant Service,
Royal Adelaide Hospital, North Terrace, Adelaide 5000

Women's and Children's Hospital, 72 King William Road, North Adelaide 5006

SOUTH AUSTRALIAN LIVER TRANSPLANT CENTRE

Flinders Medical Centre, Flinders Drive, Bedford Park 5042



Transplant Regions and Centres

WESTERN AUSTRALIA

ORGAN DONOR COORDINATORS

Monica de Caux
Susan Frew
Sarah Markham
Kylie Monk
Denyse Norman
Melissa Smith
Daniel Winters-McAppion

HEART TRANSPLANT CENTRE

Royal Perth Hospital, Wellington Street, Perth 6001

LUNG TRANSPLANT CENTRE

Royal Perth Hospital, Wellington Street, Perth 6001

WA LIVER TRANSPLANTATION CENTRE

Sir Charles Gairdner Hospital, Verdun Street,
Nedlands WA 6009

RENAL TRANSPLANT CENTRES

Princess Margaret Hospital for Children, Roberts
Road, Subiaco 6008

Royal Perth Hospital, Wellington Street, Perth 6001
Sir Charles Gairdner Hospital, Verdun Street,
Nedlands 6009

NEW ZEALAND

ORGAN DONOR COORDINATORS

Rachel Josephson
Janice Langlands
Mary O'Donnell
Cecilia Westmacott

HEART AND LUNG TRANSPLANT CENTRE

Greenlane Clinical Centre, Greenlane, Auckland

NEW ZEALAND LIVER TRANSPLANT UNIT (NZLTU)

Level 15, Support Building, Auckland City Hospital,
Auckland

PANCREAS TRANSPLANT CENTRE

Level 15, Support Building, Auckland City Hospital,
Auckland

RENAL TRANSPLANT CENTRES

Auckland City Hospital, Grafton Road, Auckland

Starship Children's Hospital, Auckland

Christchurch Hospital, Riccarton Avenue, Christchurch

Wellington Hospital, Riddiford Street, Newtown,
Wellington

NORTHERN TERRITORY

ORGAN DONOR COORDINATORS

Kelly Anstey
Justine Clarke
Andrea James
Deborah Josling
Michelle Thomas

History of ANZOD



The Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) records that the first deceased donor kidney transplant in Australia was performed (from a donor after cardiac death) in Melbourne in 1963. While systematic collection of information about transplant outcomes was established at the beginning of transplantation in Australia, there was no nation-wide collection of information about deceased organ donors until 1989.

By the mid 1980s, all states and territories had introduced near identical human tissue Acts which defined the legal criteria by which organs could be obtained from deceased and living persons as well as codifying both circulatory and neurological definitions of death. The legal criteria for brain death opened up the field of transplantation to organs and tissues other than kidneys and corneas: heart, liver, lung and kidney/pancreas transplants. With increasing awareness of transplant programs people were able to consider that donation of 'all organs and tissues' was possible in the event of their death and that numerous people could benefit should they do so. This now imposed a logistic challenge on transplant teams, often from different hospitals and in different states, to ensure that the organs were retrieved in a timely and coordinated way. In Australia co-ordination of kidney retrieval from deceased donors between 1963 and 1983 had been performed primarily by renal physicians and their registrars. The need for a central

coordination contact/hub that could liaise with all organ transplant teams and the donor hospital intensive care unit became obvious. By 1983 the role of the organ donor co-ordinator was well established in the United Kingdom and the United States and Australia followed suit with a donor co-ordinator job description based on the UK model.

What is now known as the Australian and New Zealand Organ Donor Registry (ANZOD) was a joint initiative of ATCA and the ANZDATA Registry. At a 1989 ATCA meeting in Melbourne it was proposed that a database of all organ donors be established. Such a registry would provide demographic, clinical and organ distribution data on a national (and later international) scale.

Initially ATCA itself intended to establish the database but following a proposal from the Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) a collaborative venture was undertaken – ATCA would provide the dataset and the data while ANZDATA would provide the data entry and analysis.

The ANZDATA Registry took on this task and the Australian and New Zealand Organ Donation (ANZOD) registry was commenced in 1989. Funding is provided by the Australia Organ and Tissue Donation and Transplantation Authority, the New Zealand Ministry of Health and Kidney Health Australia.

PAST MEDICAL HISTORY RISK FACTORS

16

Updated January 2010

31. Donor Coordinator Contact with Donor Family	☐	F=Face-to-Face T=Telephone N=None
32. Coroner's Case	☐	Y=Yes N=No
33. Authority for Research Organs / Tissue	☐	Y=Yes N=No

Data Collection Form



AUSTRALIA AND NEW ZEALAND ORGAN DONATION REGISTRY INSTRUCTIONS FOR COMPLETION OF DONOR SHEET

1. **DONOR NUMBER**
State prefix, then number (eg. Q00001, N00023, W00154, W00122)
Q=Queensland W=Western Australia
N=New South Wales/ACT Z=New Zealand
V=Victoria/Tasmania O=Other
S=South Australia/NT
2. **DONOR - ACTUAL OR INTENDED**
A=Actual
A person from whom the retrieval operation is commenced for the purpose of transplantation. This includes donors who may be deemed medically unsuitable at time of surgery or after removal of organs
B=Intended
A person from whom authority has been given or not given, but organ donation did not proceed. (eg. positive virology, cardiac arrest, further investigations discovered cancer, infection etc)
Record reason in Section 20 or 35
3. **DONOR HOSPITAL AND STATE**
Code as per ANZDATA hospital list
(eg. RMBH3, POWH2, QEZB5, RLPT8)
If a hospital is not on the list, write on the sheet and the Registry will provide a code
Do not use code that is used by the tissue typing laboratory for allocation
4. **DATE OF BIRTH**
Two digits per box = DD.MM.YY (eg 03.04.80)
5. **POSTCODE**
Postal residential address of donor. Enter 9999 if overseas resident temporarily in Australia or NZ
6. **GENDER**
M=Male or F=Female
7. **HEIGHT**
Enter to nearest centimetre (eg 160.5 = 161)
If unknown enter X
8. **WEIGHT**
Enter to nearest kilogram (eg 80.8 = 81)
If unknown enter X
9. **RACIAL / ETHNIC ORIGIN**
10 = Caucasian 80 = Pacific People
11 = Italian 81 = Indonesian
12 = Greek 82 = Malay
13 = Turk 83 = Filipino
20 = Aboriginal 84 = Vietnamese
30 = Chinese 70 = Indian
40 = Maori 99 = Other (Specify)
50 = Arab
10. **RELIGION**
1 = Christian (Specify)
2 = Muslim
3 = Buddhist
4 = Hindu
5 = Other (Specify)
6 = No religion
7 = Unknown
8 = Jewish

11. **OCCUPATION** Write in answer
12. **PRIMARY CAUSE OF DEATH**
11 = Motor Vehicle Accident
12 = Motor Bike Accident
13 = Cyclist
14 = Pedestrian
15 = Other Road Accident (Specify)
21 = Fall
22 = Other Accident (Specify)
23 = Gunshot
24 = Felony or Crime eg Assault (Specify)
31 = Spontaneous Subarachnoid Haemorrhage
32 = Other Spontaneous Intracranial Haemorrhage
33 = Cerebral Infarct
34 = Hypoxia (Specify)
35 = Cerebral Oedema (Specify)
40 = Cerebral Tumour (Specify benign or malignant)
If malignant-enter cancer sheet with details
50 = Drowning
51 = Sudden Infant Death Syndrome (SIDS)
52 = Hanging
53 = Asphyxia
80 = Other (Specify)
Y=Yes or N=No
13. **HEART BEATING** See Codes on form
14. **DIABETES** See Codes on form
15. **PAST HISTORY OF TREATED HYPERTENSION**
As documented in Medical Records and/or discussion with the Local Medical Officer
16. **SMOKING** See Codes on form
17. **PAST HISTORY OF CANCER**
Y=Yes N=No U=Unknown
If Yes, please enter the separate cancer form
18. **KEY EVENTS**
Admission to Hospital=Initial admission to hospital
When a patient is transferred record admission time
If exact time is unknown place X in box
Ventilation=Time of Intubation
Withdrawal (DCD)=Date and time of withdrawal
Record time of Second Brain Death Test and Cross Clamp of Aorta in Operating Theatre
If Brain Death NOT CERTIFIED (Donation After Cardiac Death (DCD) record time of cardiac death and commencement of adequate cold perfusion
19. **LABORATORY RESULTS**
Blood Group A, A1, A2, B, AB, O
(Enter subtypes A1 or A2 if known)
Do not include Rhesus Factor
Tissue Typing
If unknown or not done place X in box
20. **HEPATITIS HBV sAg, HBV CORE ANTIBODY, HCV Ab, HCV NAT (Nucleic Acid), CMV IgG, EBV (Epstein Barr Virus), HIV Antibody, HIV NAT**
OTHER - Any other virology tests performed eg Toxoplasmosis (Specify test in section below box)
Enter 1=Positive 2=Negative 3=Not Done
21. **DONOR MAINTENANCE (POST BRAIN DEATH or PRE DCD)** No doses required
If maintenance drugs given post brain death certification Enter Y=Yes or N=No
Terminal = In Intensive Care Unit (ICU) (Immediately preceding retrieval)
Mean Arterial Blood Pressure (MAP) >50 mm Hg
Enter Y=Yes or N=No (If Yes, enter duration)
22. **TERMINAL TREATMENT**
Drugs given to the donor terminally
Enter Y=Yes or N=No
23. **KIDNEY DONOR** Enter Y=Yes or N=No in box
If not all information known, enter X in box
Admission = First available result
Terminal = In Intensive Care Unit (ICU) (Immediately preceding retrieval)
Creatinine Enter as 0.08 mmol/L
Urea Enter up to three digits
eg 3.5, 12.5 mmol/L
Urine Output = last hour in ICU preceding transfer to Operating Theatre
Oliguria In last 12 hours
If Yes - Enter Duration in Hours
24. **LIVER DONOR** Enter Y=Yes or N=No in box
Enter most recent donor values prior to retrieval
25. **HEART DONOR** Enter Y=Yes or N=No in box
ECG Normal Y=Yes or N=No
Echocardiogram Y=Yes or N=No
26. **LUNG DONOR** Enter Y=Yes or N=No in box
Bronchoscopy Y=Yes or N=No
Enter last arterial blood gas
Do not use gases taken to determine brain death
Chest Trauma Enter Y=Yes or N=No in box
1=Pneumothorax 2=Chest Drain 3=Other (Specify)
27. **PANCREAS DONOR** Enter Y=Yes or N=No in box
28. **ENROLLED WITH ORGAN DONOR REGISTRY**
Enter Y=Yes R=Not Registered
A=Not Accessed S=Not Applicable
29. **DRIVER'S LICENCE** See Codes
30. **AUTHORITY (Sought By Initially)**
1 = Donor Coordinator
2 = ICU Consultant
3 = ICU Trainee eg Registrar
4 = Social Worker
5 = Other (Specify)
6 = Volunteer
7 = Nursing Staff
31. **CONTACT WITH DONOR COORDINATOR**
See Codes
32. **CORONER'S CASE** See Codes

34. **AUTHORITY SOUGHT FOR**
Y=Yes or N=No (If No, specify reason)
1 = Disease of organ
2 = Trauma to organ
3 = Age of donor
4 = Prior family request
5 = Donor refusal
If authority obtained enter Y in box - If not enter N
Reason for N is not coded
35. **ORGANS RETRIEVED** Y=Yes or N=No
Complete only for organs where authority obtained (If not retrieved - enter reason)
10 = No suitable recipient 18 = Indotropic support
11 = Disease of organ 19 = ECG
12 = Trauma to organ 20 = ABG
13 = Cardiac arrest 21 = Chest Xray
14 = Infection 22 = Logistics (Specify)
15 = Malignancy 23 = Other (Specify)
16 = Hypotension 24 = Age of donor
17 = Biochemistry 25 = Retrieval Team not available
- PRESERVATION (Solution in organ at storage)**
Record in order of solutions given
If two solutions used (eg Ross followed by UW)
Code Ross (20) in first column - then
Code UW (70) in second column
10 = No washout (ie slush only)
20 = Citrate solution (Ross)
31 = Eurocollins solution
32 = St Thomas solution
33 = HTK
50 = Normal Saline
51 = Crystalloid cardioplegia
52 = Albumin based blood cardioplegia (pneumoplegia)
56 = Perfadex
57 = Celsior
60 = Other (Specify)
70 = University Wisconsin (UW)
80 = Not applicable (cornea / bone)
90 = Hartman's solution
95 = PFC (Perfluorodecalin)-UW (islets Storage)
- RETRIEVAL TEAM**
Code as per ANZDATA Hospital List. See Question 3
36. **DESTINATION**
Hospital and State -
Code as per ANZDATA hospital list. See Question 3
Enter Transplant Hospital NOT Caring Hospital
- OUTCOME** Enter Code
T = Transplanted
E = En bloc
D = Double Adult
R = Research
S = Stored (for bone, heart valves etc)
N = Not used (Specify reason in Surname section)
U = Unusable (Specify reason in Surname section)
- RECIPIENTS' SURNAME AND GIVEN NAMES**
IMPORTANT for all solid organs
Not essential for tissue recipients

Updated January 2008



Methods

Database:

Data is stored on a relational database using ORACLE version 9i.

Statistical Methods:

All statistical analyses were performed using Stata/IC version 13.0. StataCorp. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP.

Data reported were obtained from the ANZOD 2013 database.

Australian population statistics were obtained from the Australian Bureau of Statistics, 3101.0 - Australia Demographic Statistics, Jun 2013, released 17 December 2013.

Southeast New South Wales population for local government areas obtained from the Australian Bureau of Statistics, 3235.0 - Population by Age and Sex, Regions of Australia, 2012, released 30 August 2013.

Australian death statistics were obtained from the Australian Bureau of Statistics, 3303.0 - Causes of Death, Australia, 2012, released 25 March 2014.

New Zealand death statistics were obtained from Statistics New Zealand, Births and Deaths: Year Ended December 2012.

Chapter 1

Organ Donation



in Australia and New Zealand



Overview of Organ Donation

Actual Deceased 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 rose to 16.9 dpmp in 2013, from 15.6 dpmp in 2012 and 15.1 dpmp in 2011. In New Zealand, the rate decreased to 8.1 dpmp in 2013 from 8.6 dpmp in 2012 and by 1.9 dpmp since 2009.

Of the 391 actual deceased organ donors in 2013 for Australia, 375 donors had at least one organ retrieved. Of those 375 donors, 362 resulted in at least one organ transplanted.

Sixteen actual donors had no organs retrieved. This

number has increased over the past five year from six in 2009 to sixteen in 2013. The reasons these donors had no organs retrieved is a result of twelve donors with medically unsuitable organs for transplantation; one donor was discovered with malignancy and there were no suitable recipients for three donors. Twelve of these 16 donors still proceeded to donate eyes and/or tissue.

In New Zealand all 36 actual donors had at least one successfully transplanted.

In Australia, there remains variation in organ donation rates between jurisdictions (Figure 1.1).

In 2013, rates varied from 14 dpmp in New South Wales to 29 dpmp in the Northern Territory. The rate in the ACT was 16 dpmp when the NSW Southern Area Health Service population was excluded, but 10 dpmp when this area was included.

Figure 1.1

Number of Actual Deceased Organs Donors** by Retrieval State / Country ^(x) 2009 - 2013 () Donors Per Million Population					
	2009	2010	2011	2012	2013
Queensland	47 (11)	49 (11)	67 (15)	78 (17)	77 (17)
New South Wales + *	68 (10+) (10*)	87 (12+) (13*)	77 (11+) (11*)	88 (12+) (12*)	102 (14+) (14*)
ACT + *	8 (14+) (23*)	10 (17+) (28*)	8 (14+) (22*)	12 (20+) (32*)	6 (10+) (16*)
Victoria	65 (12)	98 (18)	107 (19)	92 (16)	110 (19)
Tasmania	5 (10)	10 (20)	6 (12)	15 (29)	8 (16)
South Australia	33 (21)	31 (19)	35 (21)	29 (18)	34 (20)
Northern Territory	2 (9)	2 (9)	4 (17)	8 (34)	7 (29)
Western Australia	19 (8)	22 (10)	33 (14)	32 (13)	47 (19)
Australia	247 (11.3)	309 (14)	337 (15.1)	354 (15.6)	391 (16.9)
New Zealand	43 (10)	41 (9.4)	38 (8.6)	38 (8.6)	36 (8.1)
(x) refers to donors retrieved by retrieval State (e.g. Albury-NSW donors retrieved by Victoria) + NSW population excludes residents of the NSW Southern Area Health Service (included in ACT population) * NSW population includes residents of the NSW Southern Area Health Service (excluded from ACT population) Medical services from the ACT service the NSW Southern Area Health Region. Population data - June ABS 3101.0					
** This figure relates to the number of donors for whom the retrieval operation commenced for the purpose of transplantation. It includes donors who may be deemed medically unsuitable at the time of the surgery or after removal of organs.					

Overview of Organ Donation

Figure 1.2

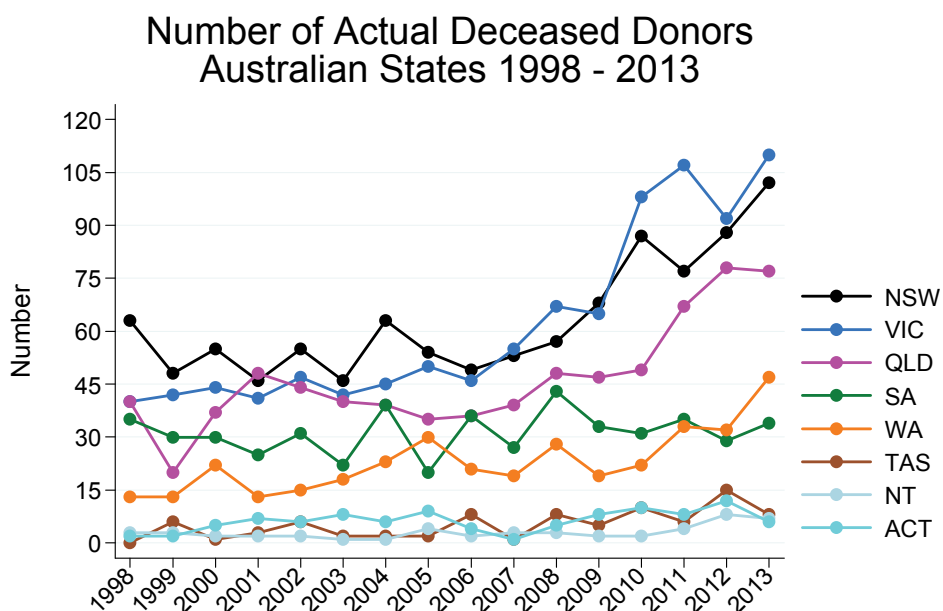
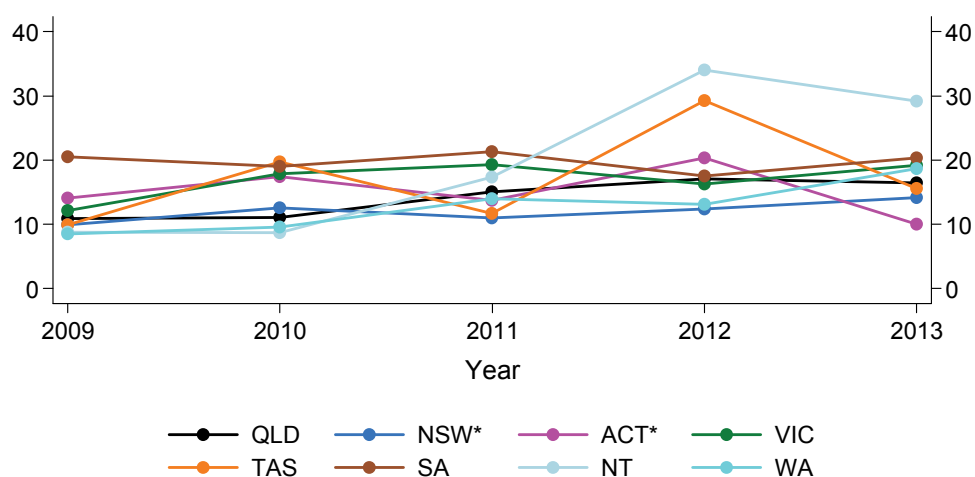


Figure 1.3

Number of Actual Deceased Donors Per Million Population Australian States 2009 - 2013



* NSW population excludes residents of the NSW Southern Area Health Service.
 * ACT population includes residents of the NSW Southern Area Health Service.

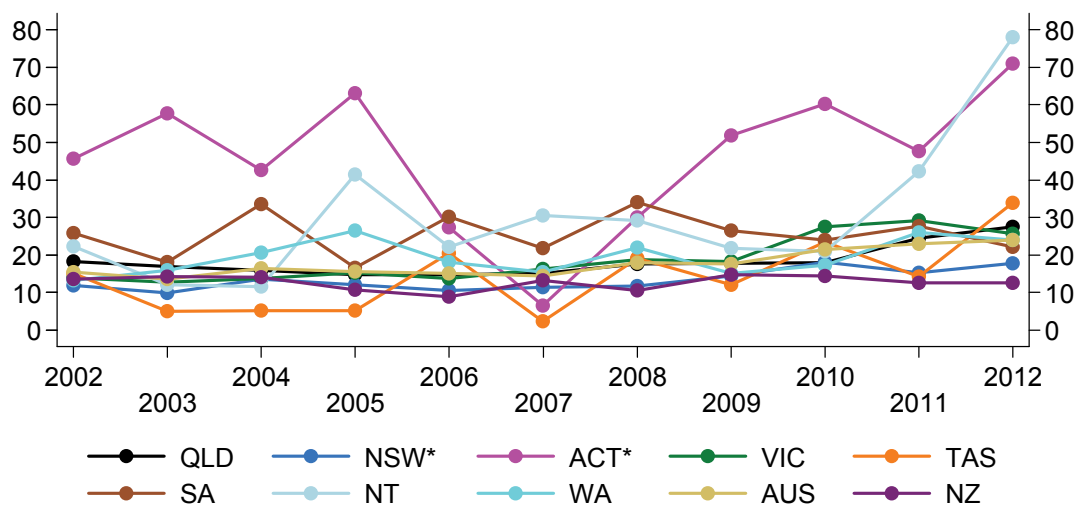


Overview of Organ Donation

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 may be a more logical comparator; rates for various jurisdictions using this metric are shown in Figure 1.4 and 1.5.

Figure 1.4

Number of Actual Deceased Donors Per 10,000 Deaths Australian States 2002 - 2012



* NSW and ACT values not adjusted for the the NSW Southern Area Health Service, as death data were not available
Australian data on deaths 2012 was the latest release at the time of this publication.
Australian Bureau of Statistics - Deaths 3303.0 and Statistics New Zealand

Figure 1.5

Donors per 10,000 Deaths Aged < 75 years 2008 - 2012

() is the % Deaths < 75 years as a Proportion of all Deaths*

Year	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
2008	47 (38%)	35 (33%)	83 (36%)	58 (33%)	56 (34%)	110 (31%)	40 (74%)	58 (38%)	52 (34%)	28 (38%)
2009	46 (39%)	42 (34%)	134 (39%)	55 (33%)	33 (36%)	82 (32%)	28 (77%)	39 (39%)	50 (35%)	39 (38%)
2010	47 (39%)	54 (34%)	166 (36%)	86 (32%)	67 (35%)	76 (32%)	28 (75%)	45 (38%)	62 (35%)	38 (38%)
2011	65 (38%)	46 (33%)	132 (36%)	91 (32%)	40 (35%)	89 (31%)	57 (75%)	68 (38%)	67 (34%)	34 (37%)
2012	74 (37%)	54 (33%)	213 (33%)	84 (31%)	101 (34%)	73 (30%)	103 (76%)	64 (37%)	71 (34%)	34 (37%)

* The number of actual donors is compared to the number of deaths that are aged less than 75 years (Figure 1.6)

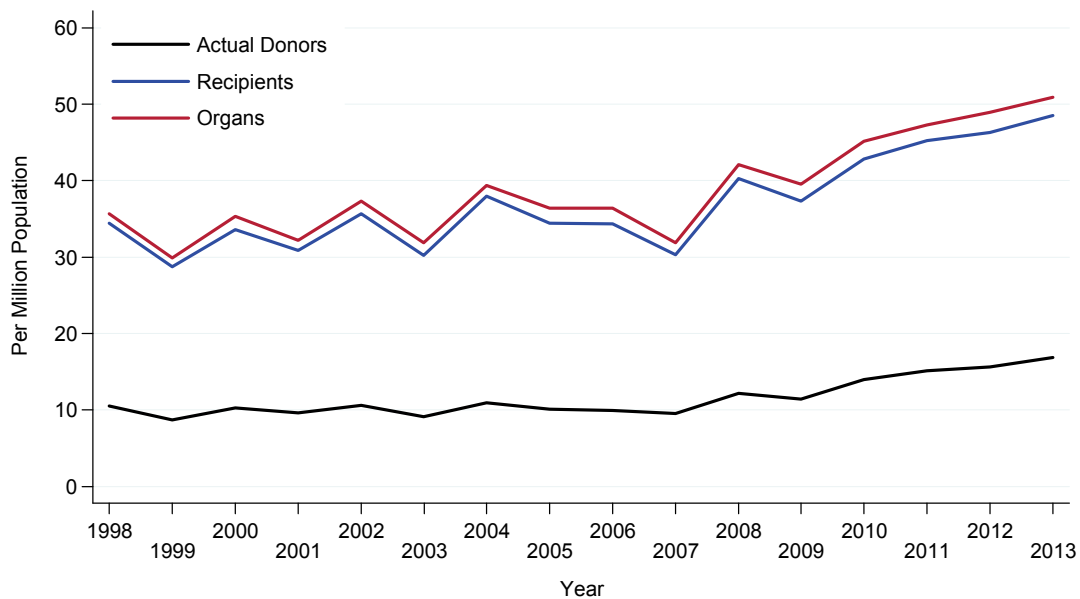
Australian Bureau of Statistics - Deaths 3303.0 and Statistics New Zealand

Overview of Organ Donation

Figure 1.6 represents the rate of organs donated, recipients transplanted and deceased organ donor number over time. Much of the increase in donor numbers has arisen from changes in rates of donors after circulatory death (DCD), demonstrated in Figure 1.7.

Figure 1.6

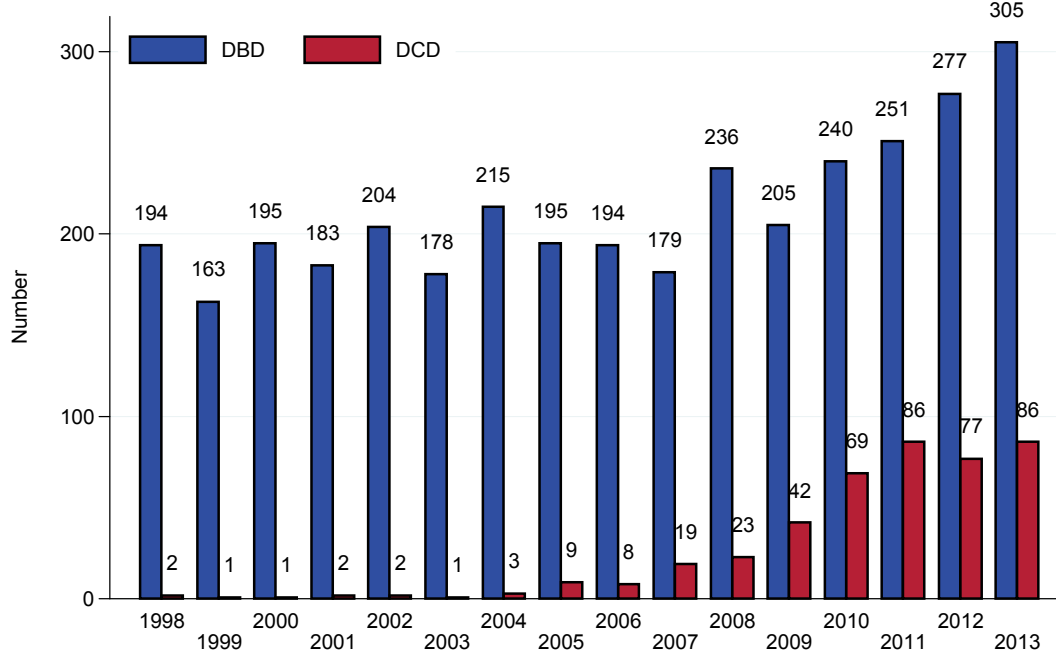
Total Number of Organs, Recipients and Actual Deceased Organ Donors Per Million Population, Australia, 1998 - 2013



Organ Donation Pathway - Australia

Figure 1.7

Organ Donation Pathway Australia 1998 - 2013





Overview of Organ Donation

Overview - Australia and New Zealand

Figure 1.8

Australia Overview

Population (million)	23.1
Actual Deceased Organ Donors - both DBD & DCD included (pmp)	391 (16.9)
Kidney Tx Recipients from deceased donors (pmp)	630 (27.2)
Liver Tx Recipients from deceased donors (pmp)	252 (10.9)
Heart Tx Recipients from deceased donors (pmp)	77 (3.3)
Heart-Lung Tx Recipients from deceased donors (pmp)	2 (.1)
Lung Tx Recipients from deceased donors (pmp)	167 (7.2)
Pancreas Tx Recipients from deceased donors (pmp)	33 (1.4)
Pancreas Islet Tx Recipients from deceased donors (pmp)	1 (0)
Total number of Transplant Recipients (pmp)^	1122 (48.5)
Total number of Organ Transplants (pmp)*	1177 (50.9)
(pmp) per million population	

Figure 1.9

New Zealand Overview

Population (million)	4.5
Actual Deceased Organ Donors - both DBD & DCD included (pmp)	36 (8.1)
Kidney Tx Recipients from deceased donors - includes all combinations (pmp)	55 (12.3)
Liver Tx Recipients from deceased donors - includes all combinations (pmp)	26 (5.8)
Heart Tx Recipients from deceased donors - includes all combinations (pmp)	9 (2)
Lung Tx Recipients from deceased donors - includes all combinations (pmp)	18 (4)
Total number of Transplant Recipients (pmp)^	108 (24.2)
Total number of Transplant Organs (pmp)*	111 (24.9)
(pmp) per million population	

* The total number of transplant organs differs from total number of transplant recipients as each organ, with the exception of double-lung, is counted as a single organ transplant.

^ The total number of recipients include all combinations of multi-organ transplants as a single count of transplantation.

Note: Further information on organ transplants can be found in Chapter 5 - Organ Data.

Overview of Organ Donation

Organ Transplants

Figure 1.10

Number of Organ Transplants in 2013 by State / Country of Donation (pmp) in Australia and New Zealand										
Organs	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
Kidney	128	167	11	167	15	55	14	88	645 [^] (27.9)	58 [*] (13.0)
Liver	45	74	7	57	7	24	5	33	252 ⁺ (10.9)	26 ⁺⁺ (5.8)
Heart	15	21	2	17	0	10	1	11	77 (3.3)	9 (2.0)
Heart/Lung	0	2	0	0	0	0	0	0	2 (0.1)	0 (0.0)
Lung	36	40	3	47	4	12	3	22	167 [#] (7.2)	18 (4.0)
Pancreas	2	13	2	6	1	5	0	4	33 (1.4)	0 (0.0)
Pancreas Islets	0	0	0	0	0	1	0	0	1 (0.0)	0 (0.0)
Intestine	0	0	0	0	0	0	0	0	0 (0.0)	0 (0.0)
Total	226	317	25	294	27	107	23	158	1177 (50.9)	111 (24.9)

[^] includes 615 single kidneys, 9 double adult kidneys and 6 enbloc kidneys in Australia
^{*} includes 52 single kidneys, 2 double adult kidneys and 1 en-bloc kidneys in New Zealand
⁺ includes 207 whole liver, 38 split liver and 7 cut down liver in Australia
⁺⁺ includes 21 whole liver, 4 spilt liver and 1 cut down liver in New Zealand
[#] includes 162 double lung and 5 single lung in Australia

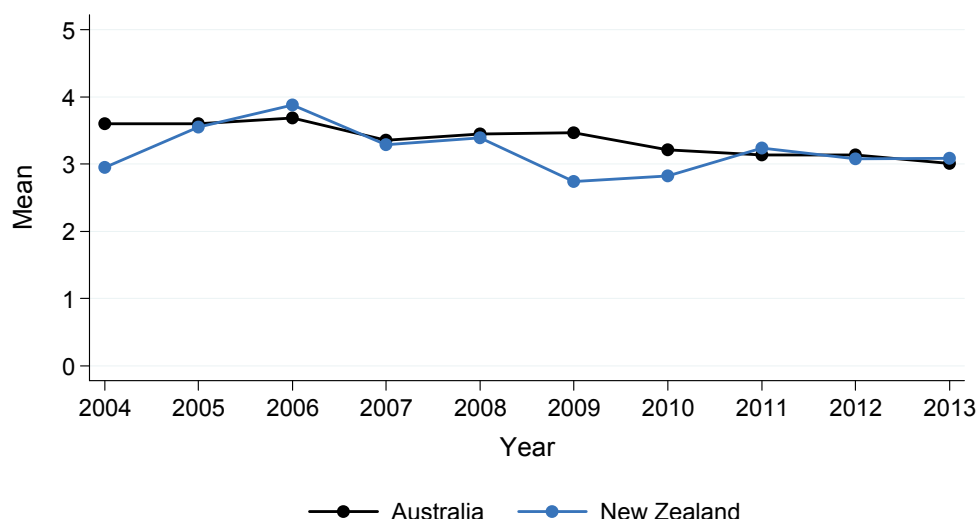
The number of organ transplants per donor is calculated by the number of organs retrieved from actual donors for the purpose of transplantation divided by the number of actual donors.

The number of organ transplants per donor each year from 2004 - 2013 in Australia and New Zealand is shown in Figure 1.11.

The number of transplant organs per donor across Australia ranged from 4.2 organ transplants in the ACT to 2.6 in Victoria.

Figure 1.11

Number of Transplant Organs per Donor 2004 - 2013





Overview of Organ Donation

Figure 1.12 shows the organ-specific transplant rates for Australia over the period 1998 - 2013 (i.e. organ transplants per million population). Figure 1.13 shows the corresponding rates for donation after circulatory death. Transplantation of organs from DCD has contributed to a significant increase in the rate of kidney transplantation.

Figure 1.12

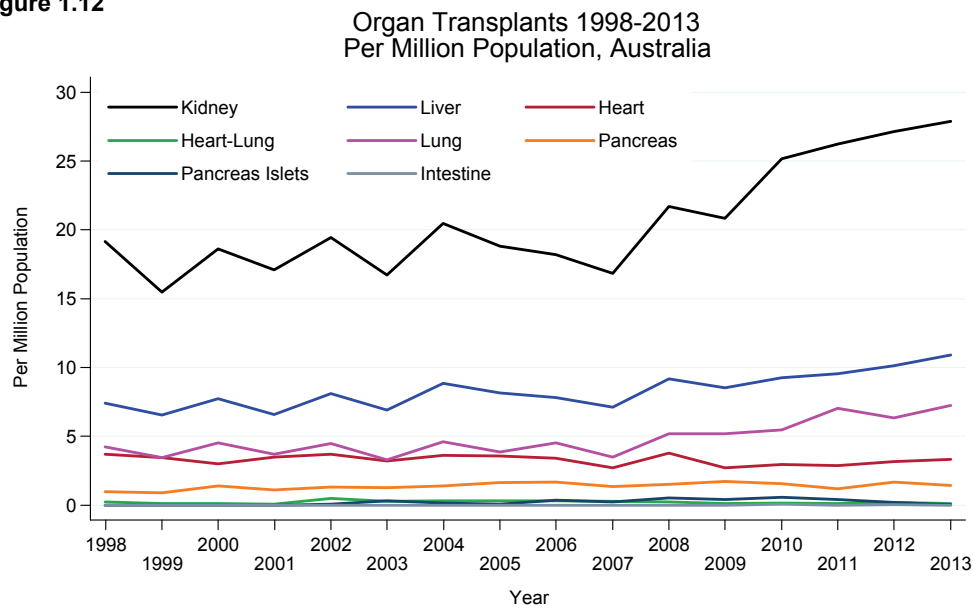
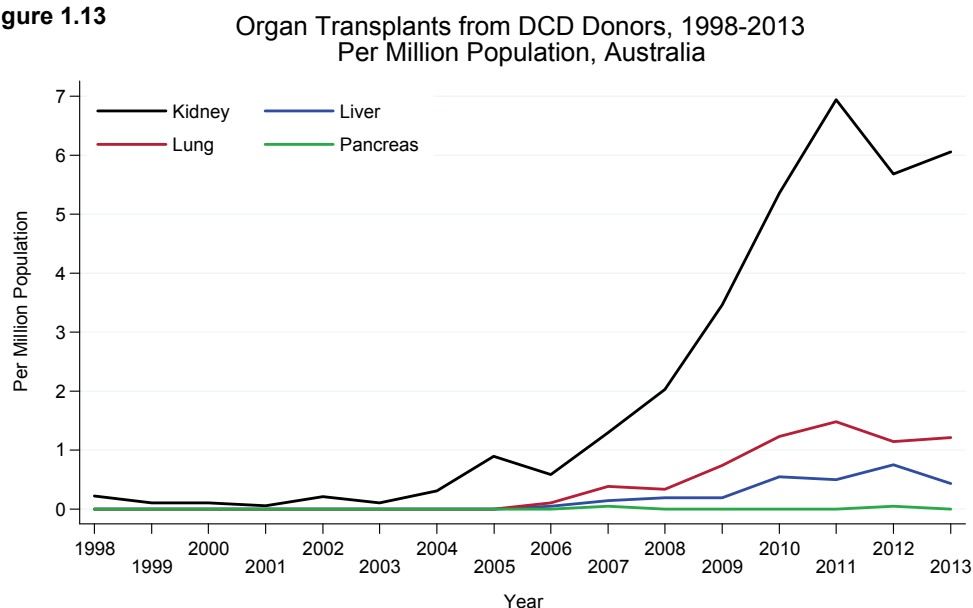


Figure 1.13



Overview of Organ Donation

Location of Deceased Donors

The number of deceased donors previously reported in this chapter are based on the State/Territory and country location in which the donor died, Figure 1.14 details the number and proportion of donors 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>).

Supplement 1 shows a more detailed breakdown of the number of donors by retrieval hospital.

Figure 1.14

Location of Deceased Donors 2009 - 2013									
ARIA	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST
Major Cities of Australia	172 (54%)	306 (73%)	29 (66%)	335 (71%)	1 (2%)	110 (68%)	2 (9%)	103 (68%)	1058 (65%)
Inner Regional Australia	86 (27%)	87 (21%)	11 (25%)	114 (24%)	24 (56%)	24 (15%)	1 (4%)	30 (20%)	377 (23%)
Outer Regional Australia	49 (15%)	19 (5%)	3 (7%)	15 (3%)	15 (35%)	22 (14%)	13 (57%)	8 (5%)	144 (9%)
Remote Australia	4 (1%)	2 (<1%)	0 (0%)	0 (0%)	2 (5%)	3 (2%)	4 (17%)	7 (5%)	22 (1%)
Very Remote Australia	2 (1%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (1%)	3 (13%)	3 (2%)	10 (1%)
Overseas	4 (1%)	5 (1%)	1 (2%)	5 (1%)	1 (2%)	1 (1%)	0 (0%)	1 (1%)	18 (1%)
Total	317	419	44	469	43	162	23	152	1629

In the last five years (2009-2013) there have been 18 deceased donors who were visitors to Australia. In 2013, there were three donors from overseas in Australia, two donated from New South Wales and one from Western Australia.

There were no overseas donors in New Zealand in 2013.

The Registry does not consider organs donated in Australia and transplanted in New Zealand as an overseas donor for New Zealand, nor organs donated in New Zealand and transplanted in Australia as an overseas donor for Australia.



Chapter 2

International Data



in Australia and New Zealand



International comparisons

International Deceased Organ Donor Rates (Per Million Population)

Organ donation and transplantation is a world wide practice which extends and enhances the quality of life for people suffering end stage organ failure. Many countries have implemented procedures and systems to address meeting the need for transplantation. In this chapter, the Registry reports on of global activity and compares Australia and New Zealand with other countries.

For the purpose of this comparison, data has been sourced from the International Registry in Organ Donation and Transplantation (IRODaT). Data was sourced on July, 31, 2014 from the IRODaT website <http://www.irodat.org/> and represents data compiled from a broad selection of the 72 world wide contributing countries over the past 5 years.

Data reported on international donation and transplantation rates may differ to that reported elsewhere if contributing countries have updated their final numbers subsequent to this publication.

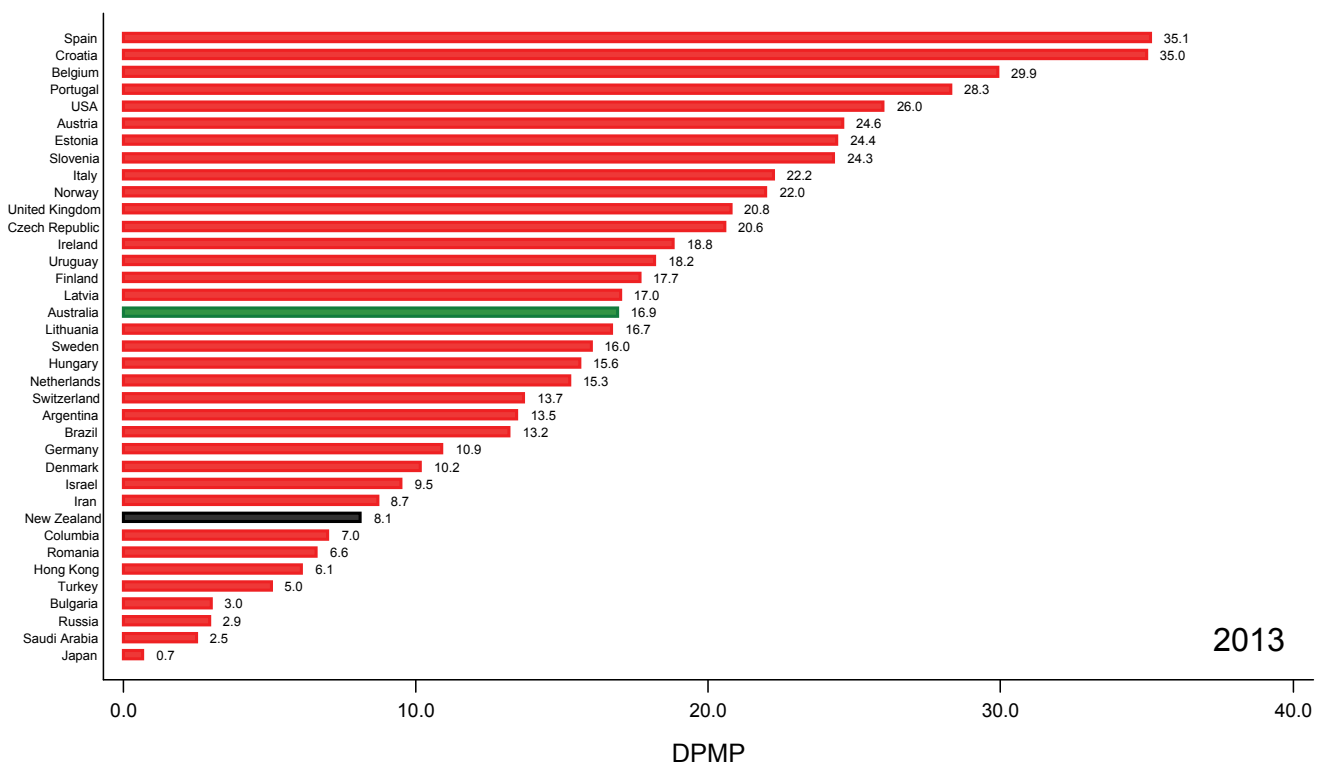
Organ donation and transplantation rates vary across the world and many countries are striving to increase donor numbers. Despite the various programs, there remains unmet demand. Globally there is considerable activity and momentum among governmental and professional bodies to improve donation rates.

The usual metric of measuring and comparing international deceased organ donation rates is 'donors per million population'. Figures 2.1 to 2.5 compare deceased organ donation rates of 40 countries contributing data to IRODaT and where Australia and New Zealand are placed each year for the past 5 years.

Figures 2.6 to 2.25 compare the organ transplantation rate per million population for specific organ, retrospectively to 2010.

Figure 2.1

International Deceased Organ Donor Rates 2013



Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>

International comparisons



Figure 2.2

International Deceased Organ Donor Rates 2012

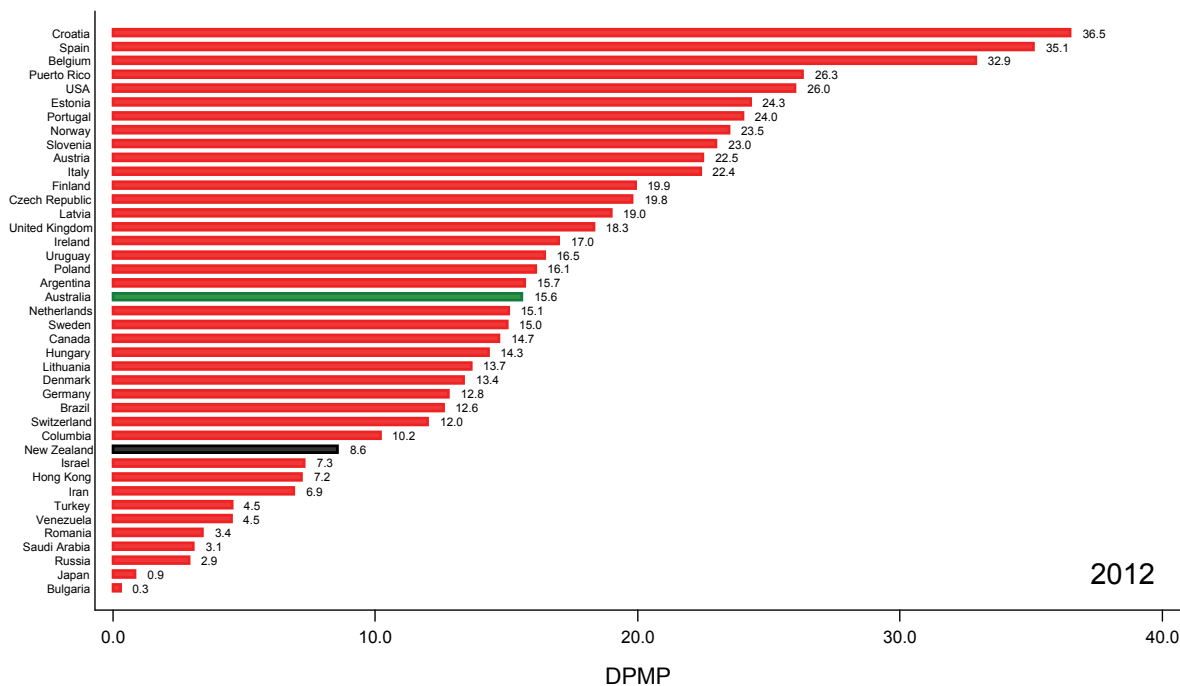
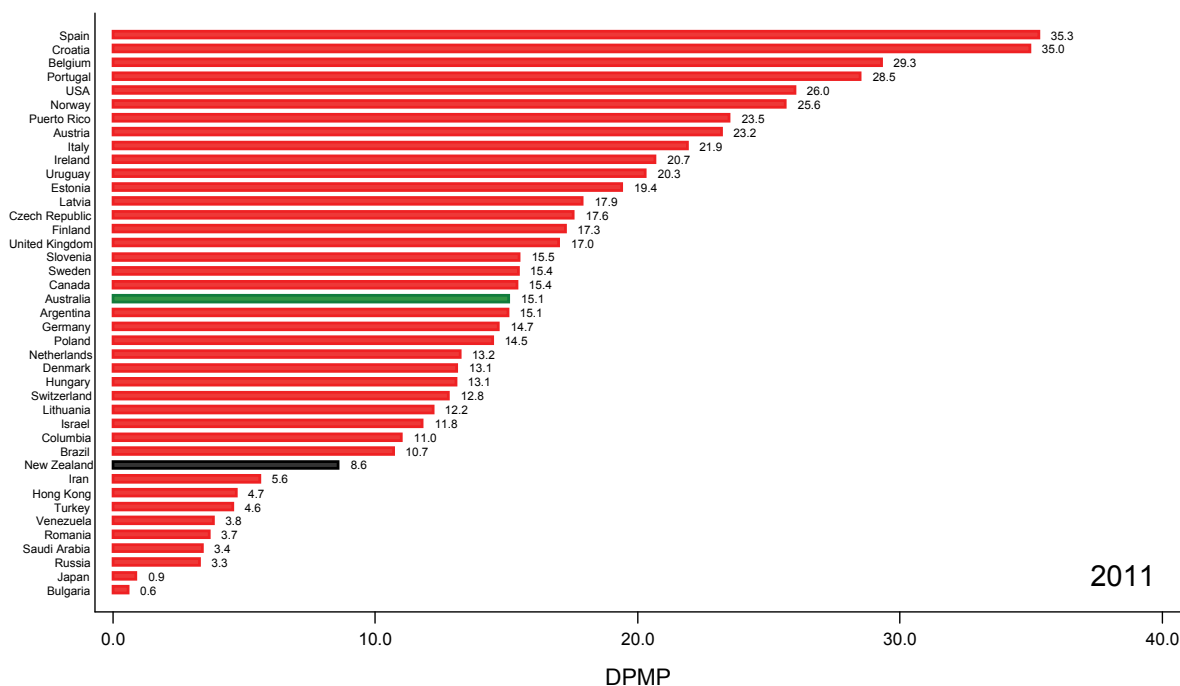


Figure 2.3

International Deceased Organ Donor Rates 2011



Data sourced on July 31, 2014 from IRODaT <http://www.irodat.org/irodat>



International comparisons

Figure 2.4

International Deceased Organ Donor Rates 2010

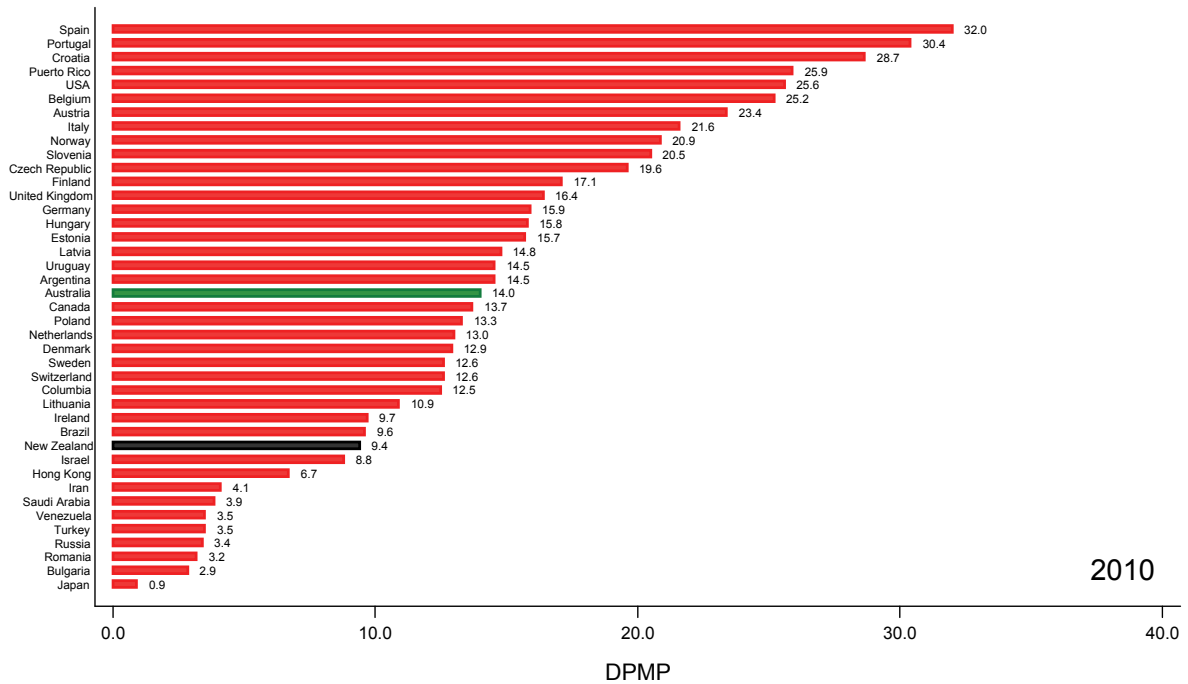
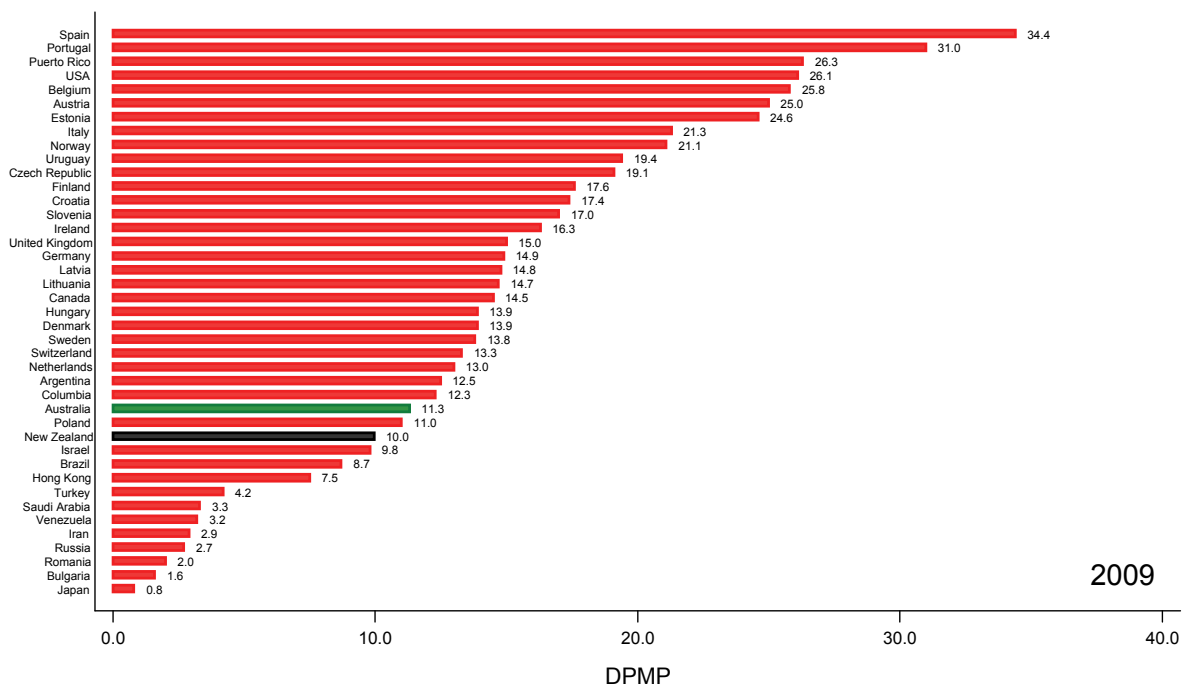


Figure 2.5

International Deceased Organ Donor Rates 2009



Data sourced on July 31, 2014 from IRODaT <http://www.irodat.org/irodat>

International comparisons



International Kidney Transplantation from Deceased

Figure 2.6

International Transplantation Rates, Kidney 2013

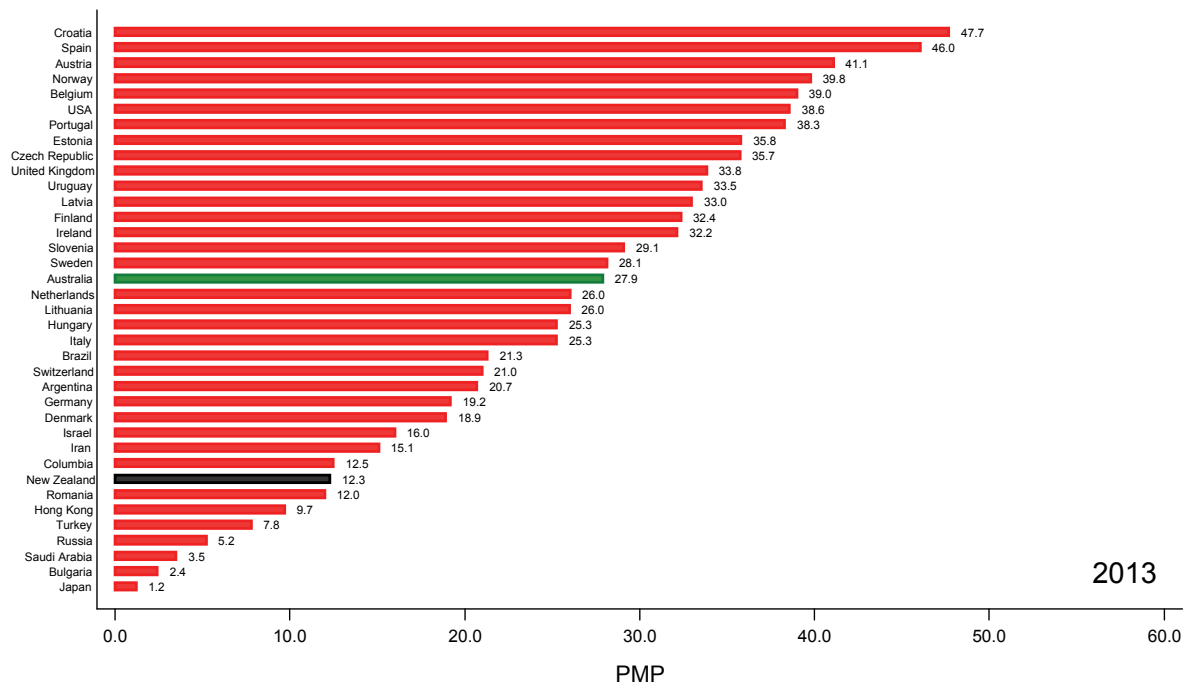
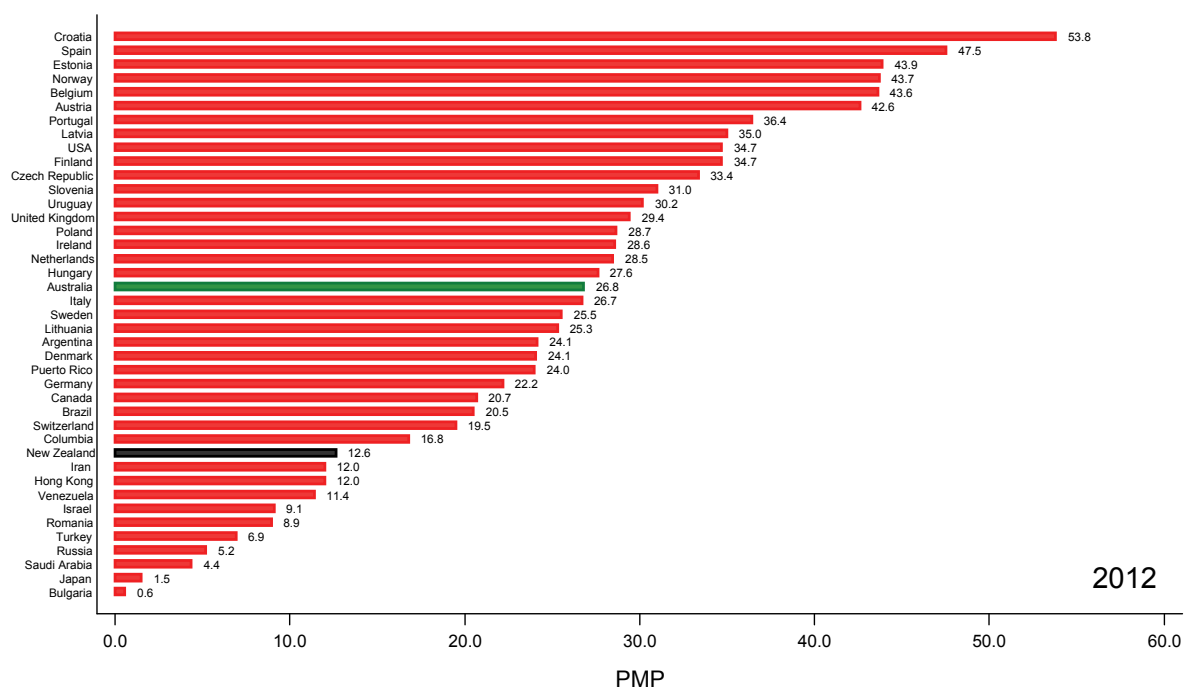


Figure 2.7

International Transplantation Rates, Kidney 2012



Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>



International comparisons

Figure 2.8

International Transplantation Rates, Kidney 2011

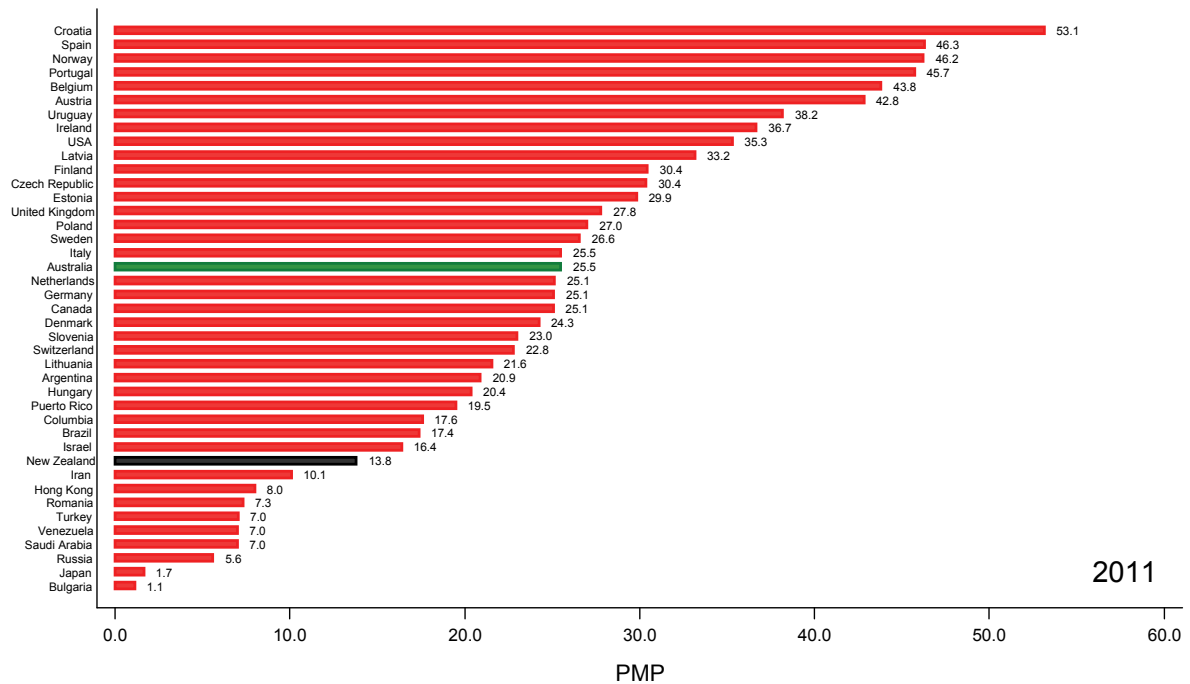
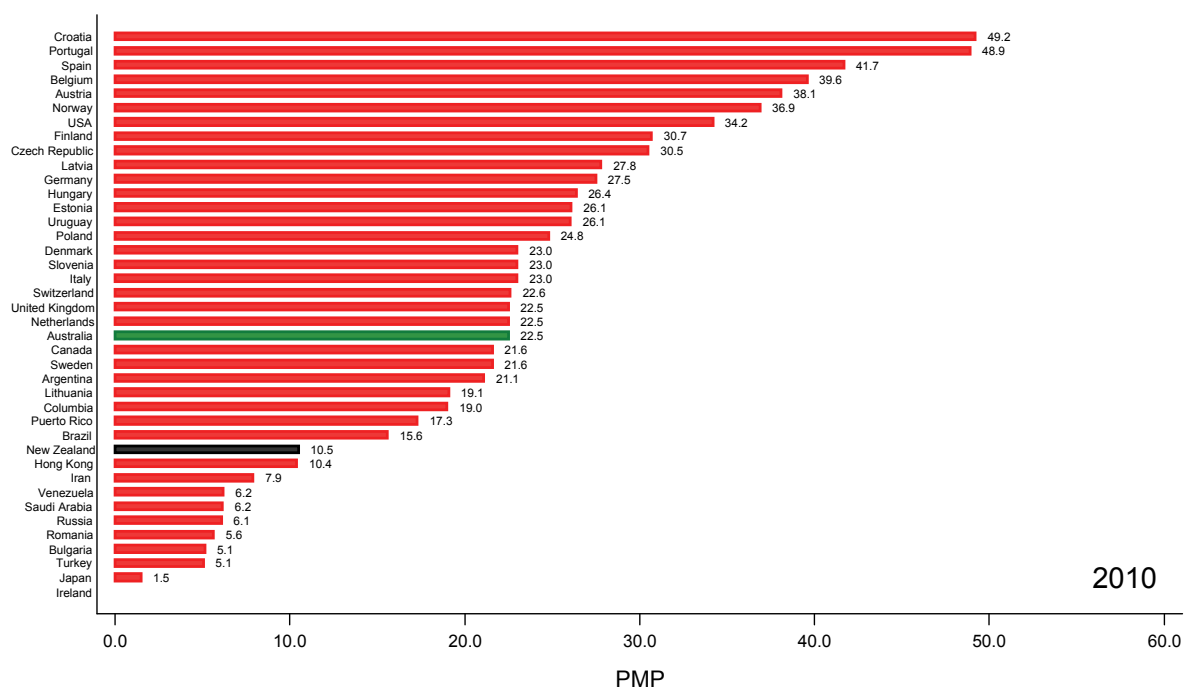


Figure 2.9

International Transplantation Rates, Kidney 2010



Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>

International comparisons



International Liver Transplantation from Deceased Donors

Figure 2.10

International Transplantation Rates, Liver 2013

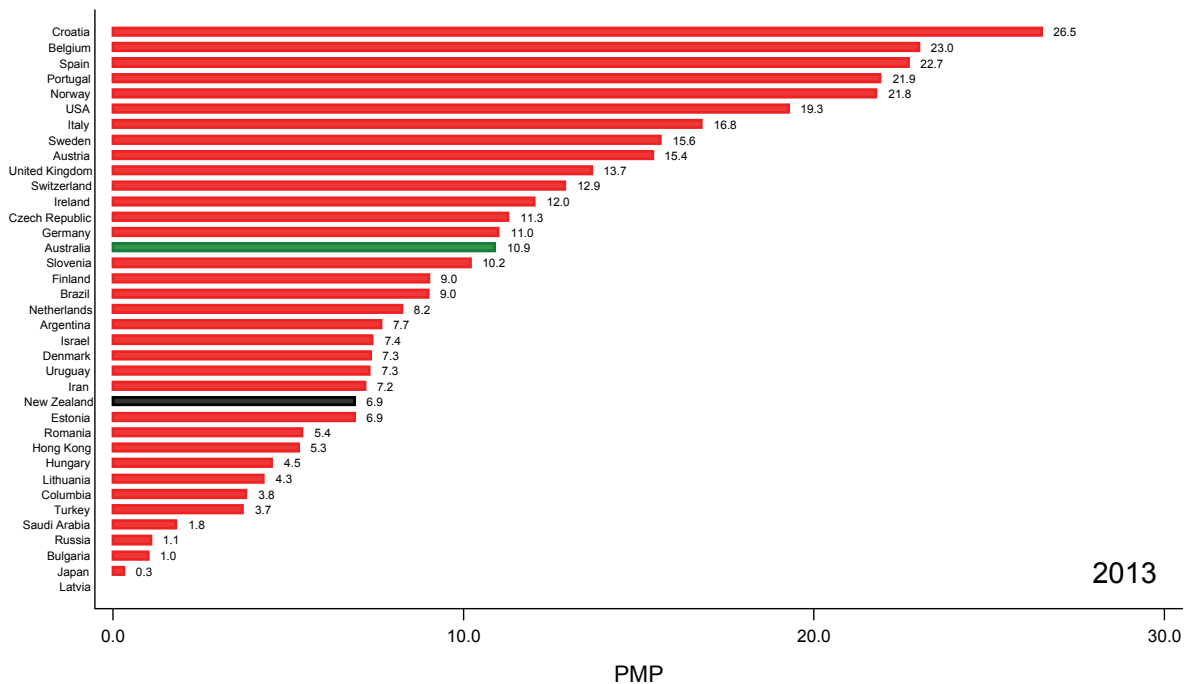
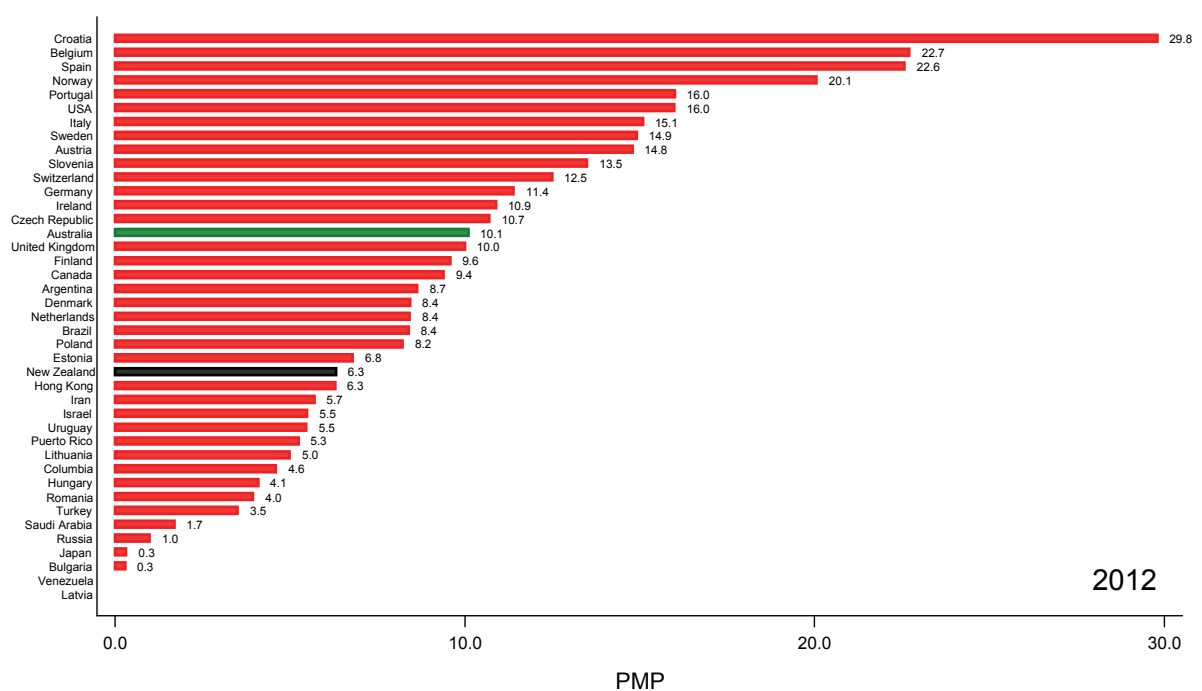


Figure 2.11

International Transplantation Rates, Liver 2012



Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>



International comparisons

Figure 2.12 International Transplantation Rates, Liver 2011

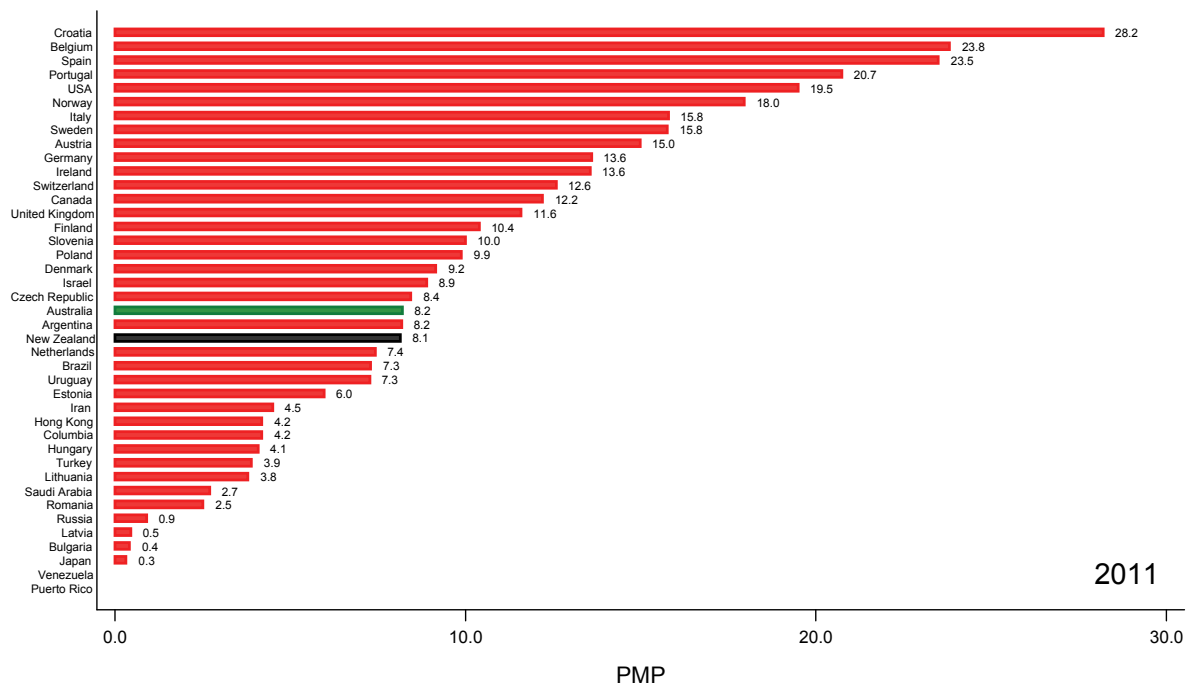
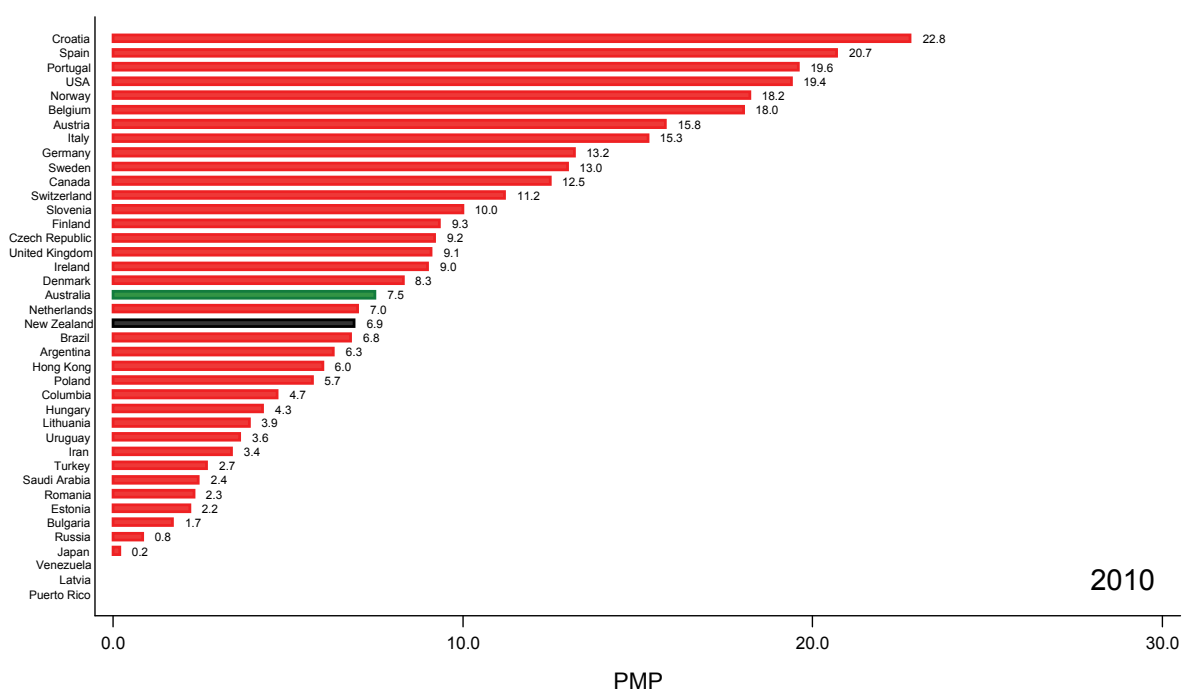


Figure 2.13 International Transplantation Rates, Liver 2010



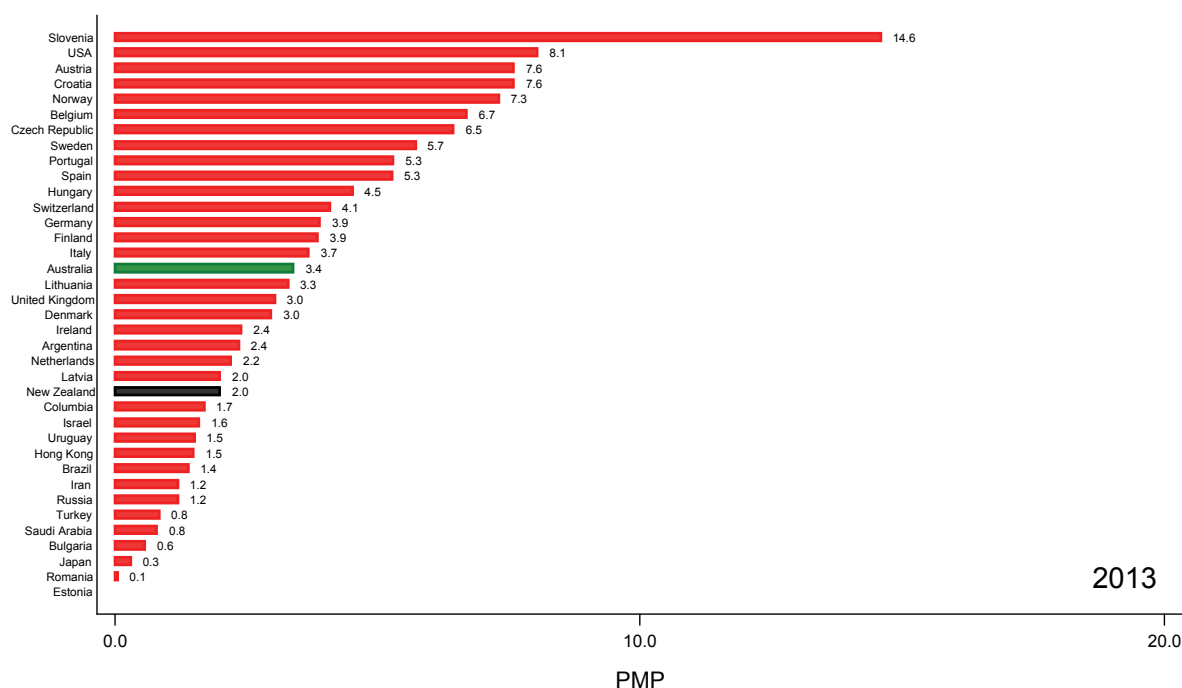
Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>

International comparisons

International Heart Transplantation from Deceased Donors

Figure 2.14

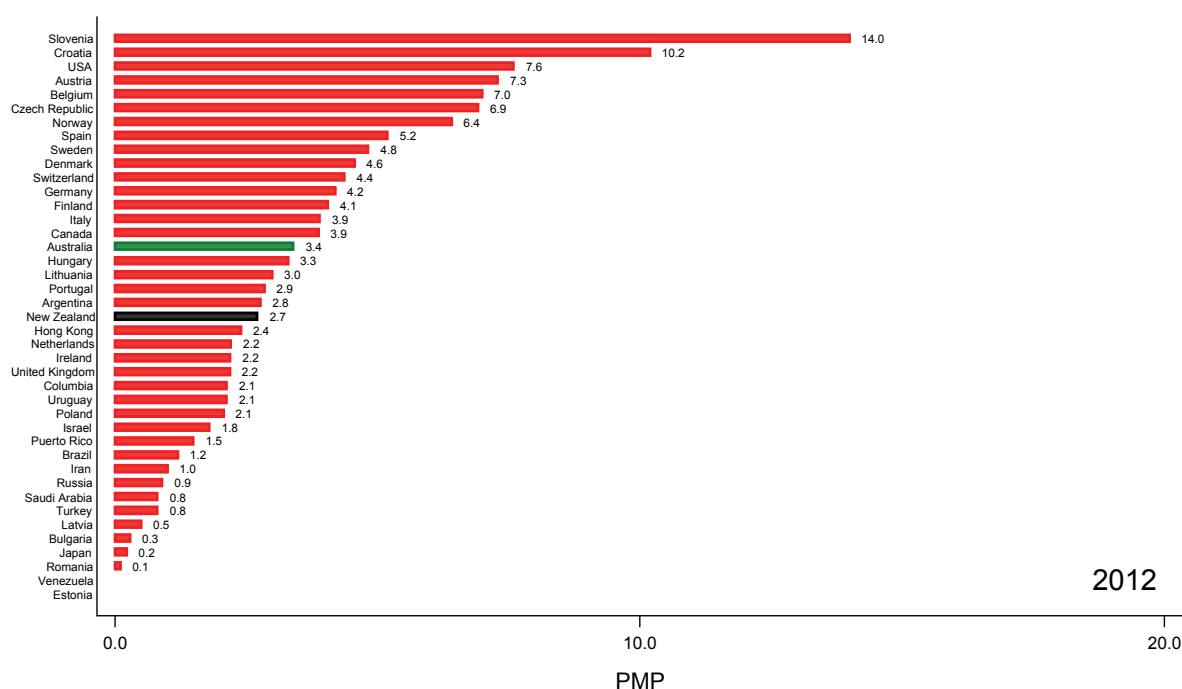
International Transplantation Rates, Heart 2013



2013

Figure 2.15

International Transplantation Rates, Heart 2012



2012

Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>



International comparisons

Figure 2.16 International Transplantation Rates, Heart 2011

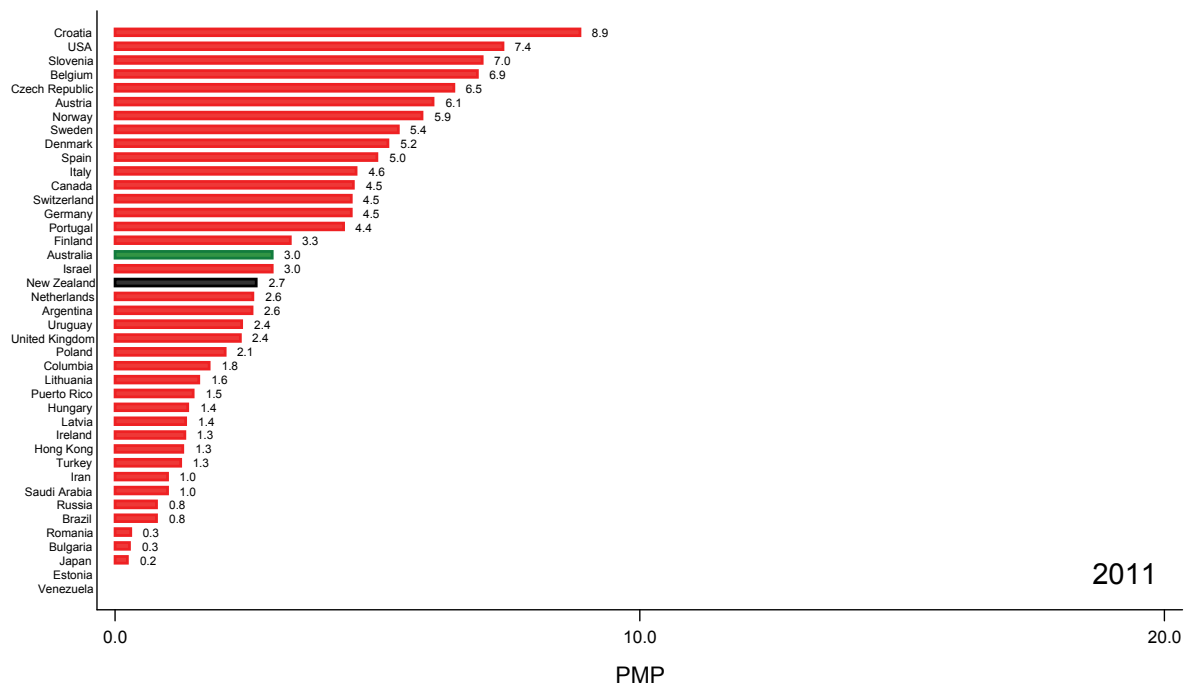
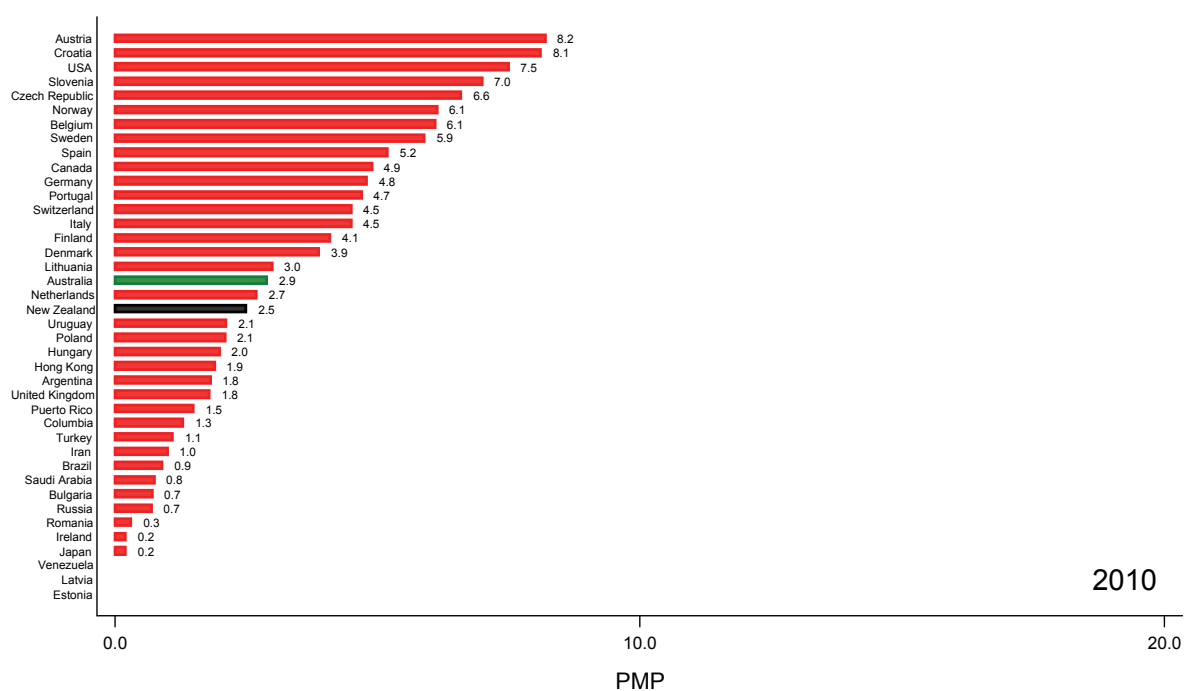


Figure 2.17 International Transplantation Rates, Heart 2010



Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>

International comparisons



International Lung Transplantation from Deceased Donors

Figure 2.18

International Transplantation Rates, Lung 2013

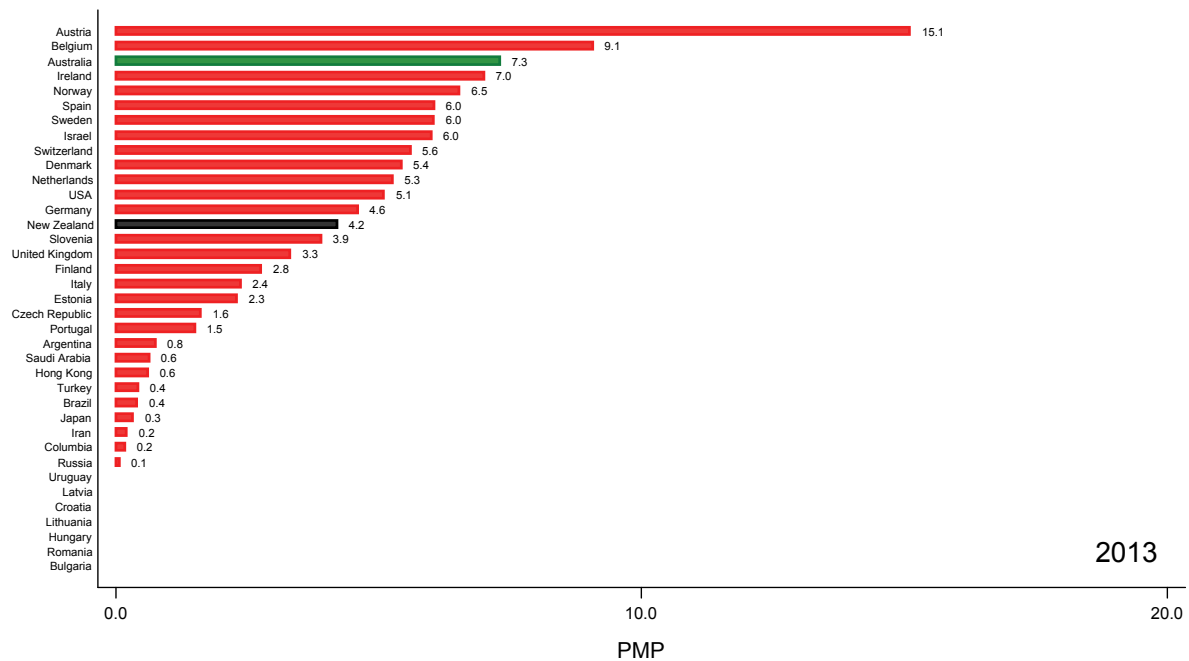
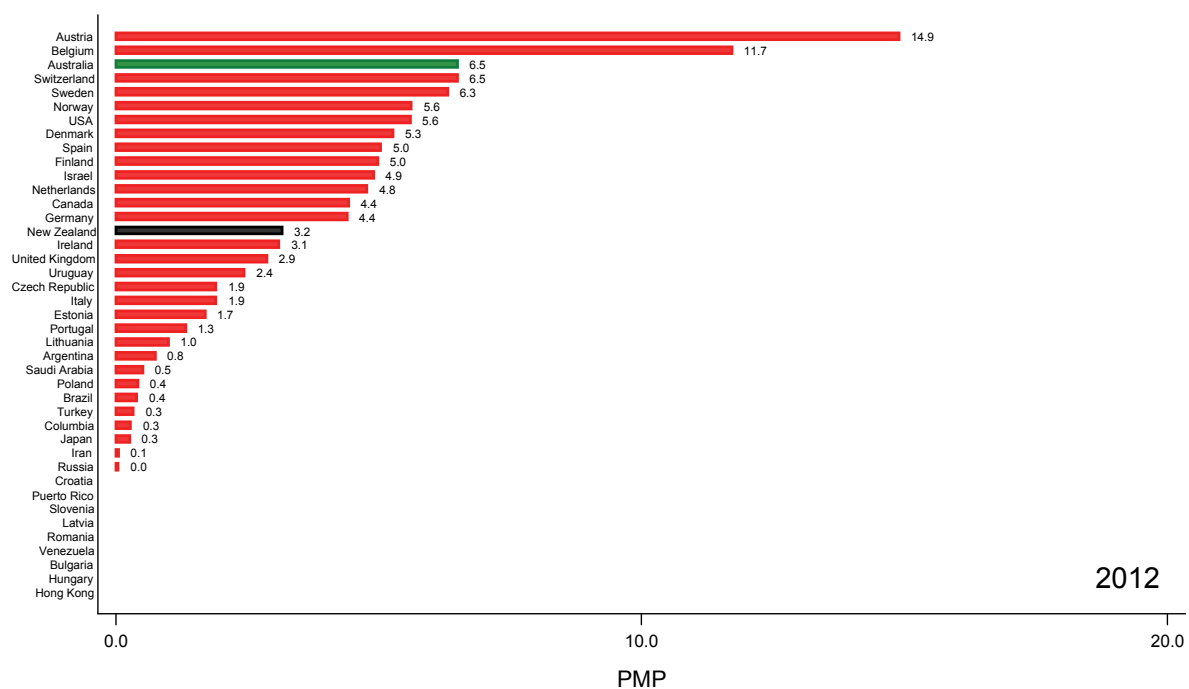


Figure 2.19

International Transplantation Rates, Lung 2012



Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>



International comparisons

Figure 2.20 International Transplantation Rates, Lung 2011

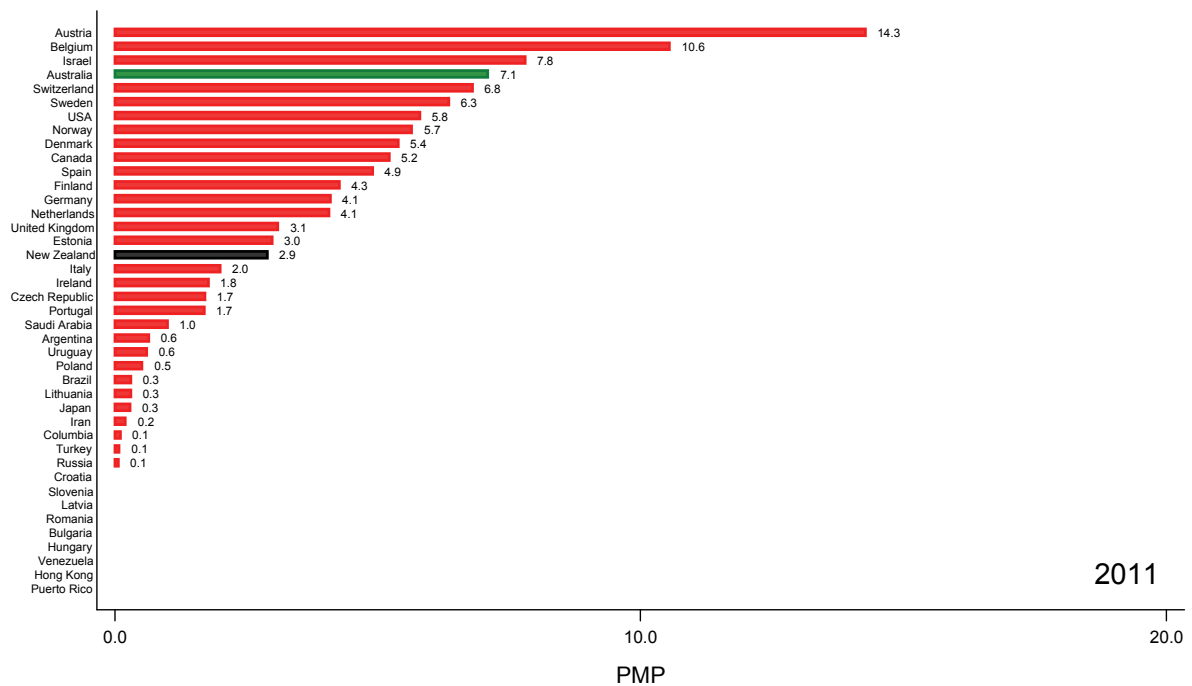
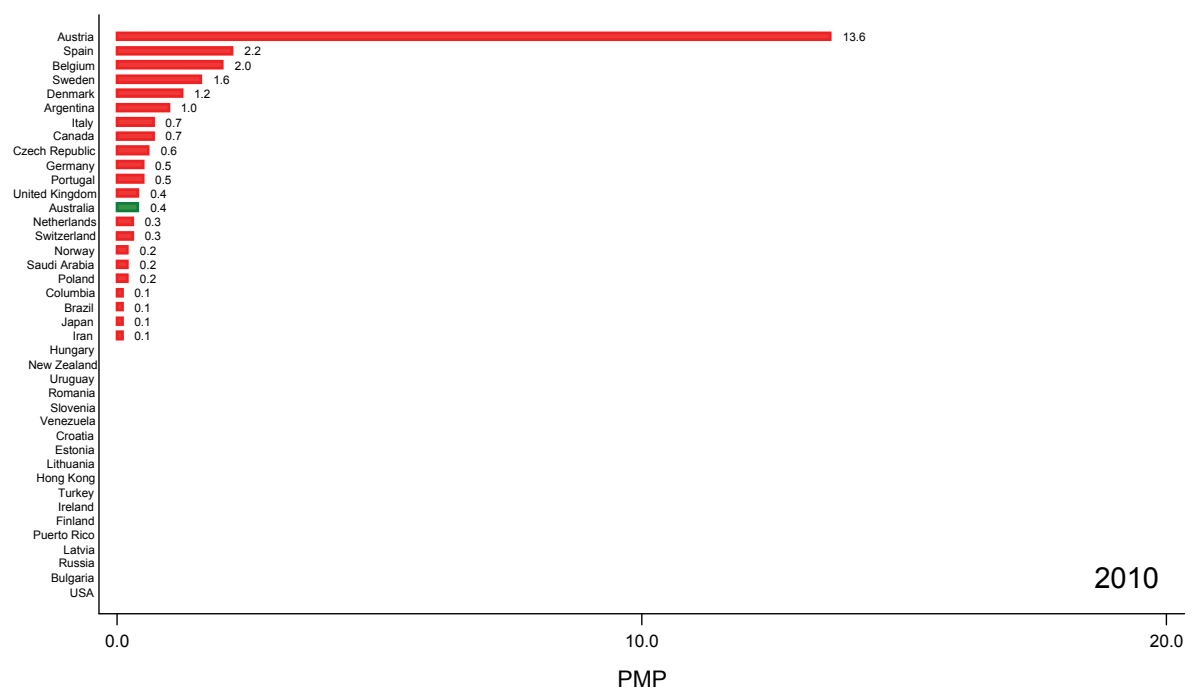


Figure 2.21 International Transplantation Rates, Lung 2010



Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>

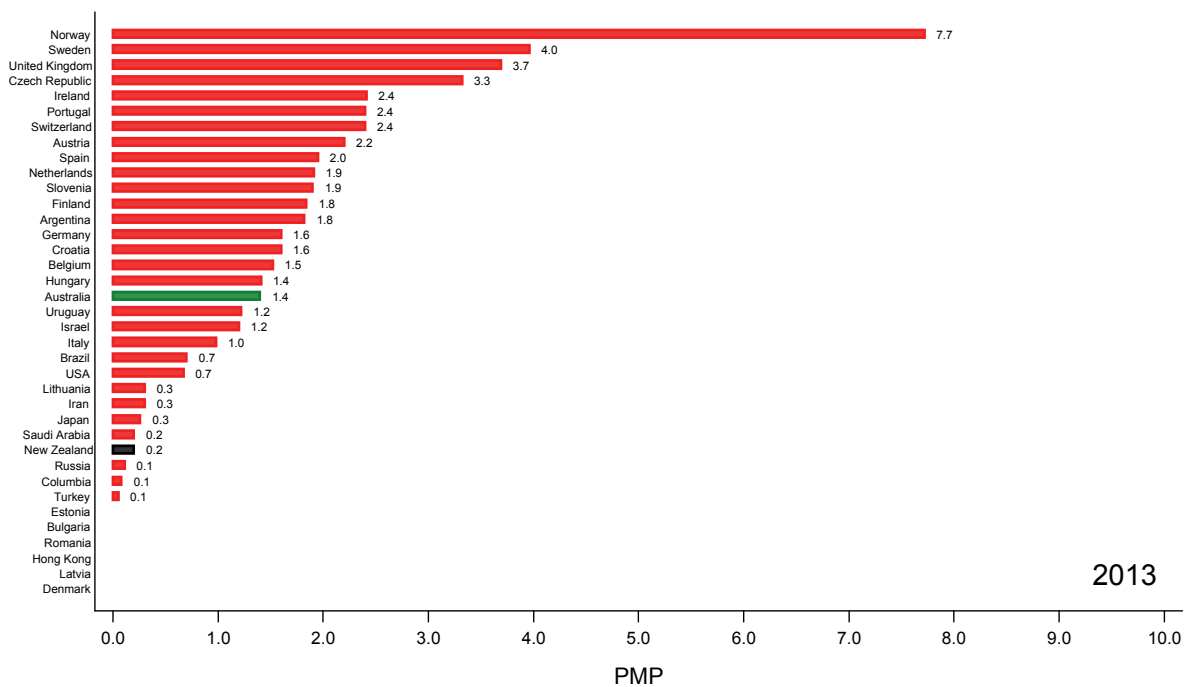
International comparisons



International Pancreas Transplantation from Deceased Donors

Figure 2.22

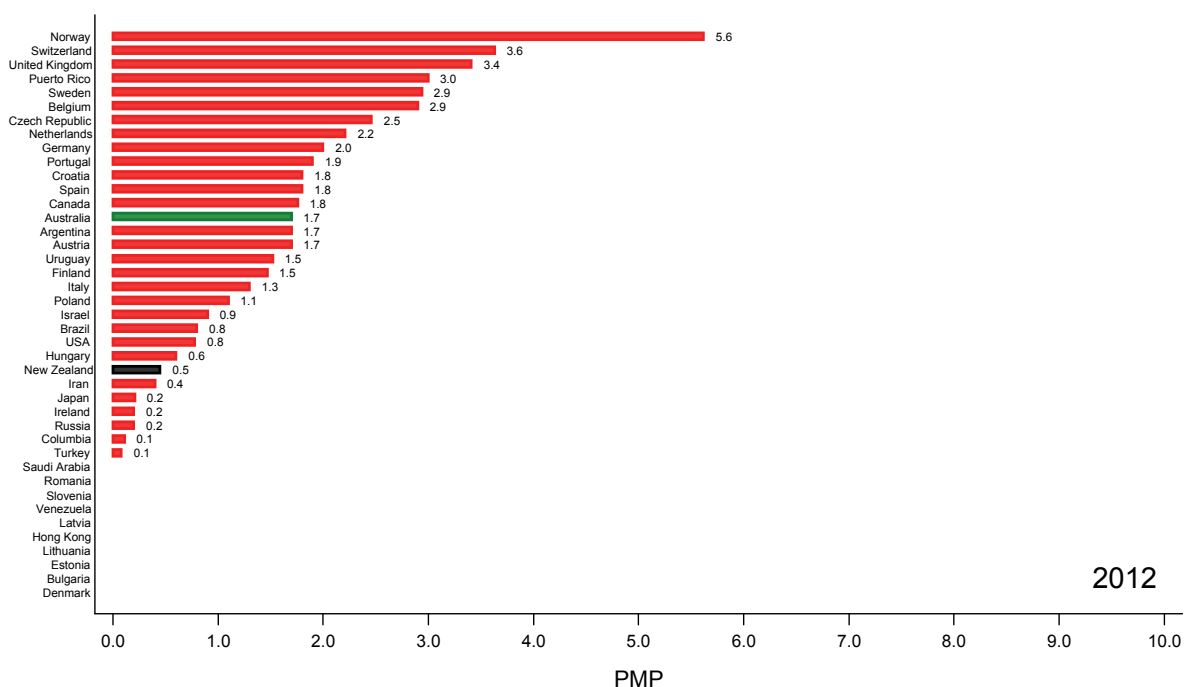
International Transplantation Rates, Pancreas 2013



2013

Figure 2.23

International Transplantation Rates, Pancreas 2012



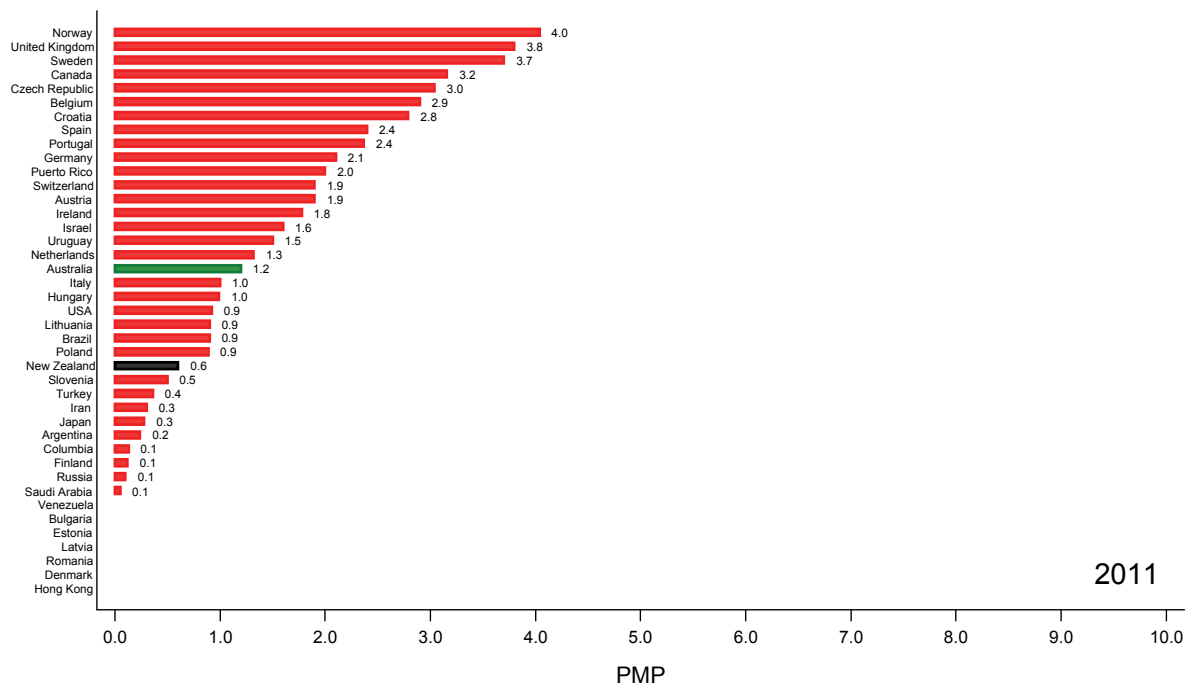
2012

Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>



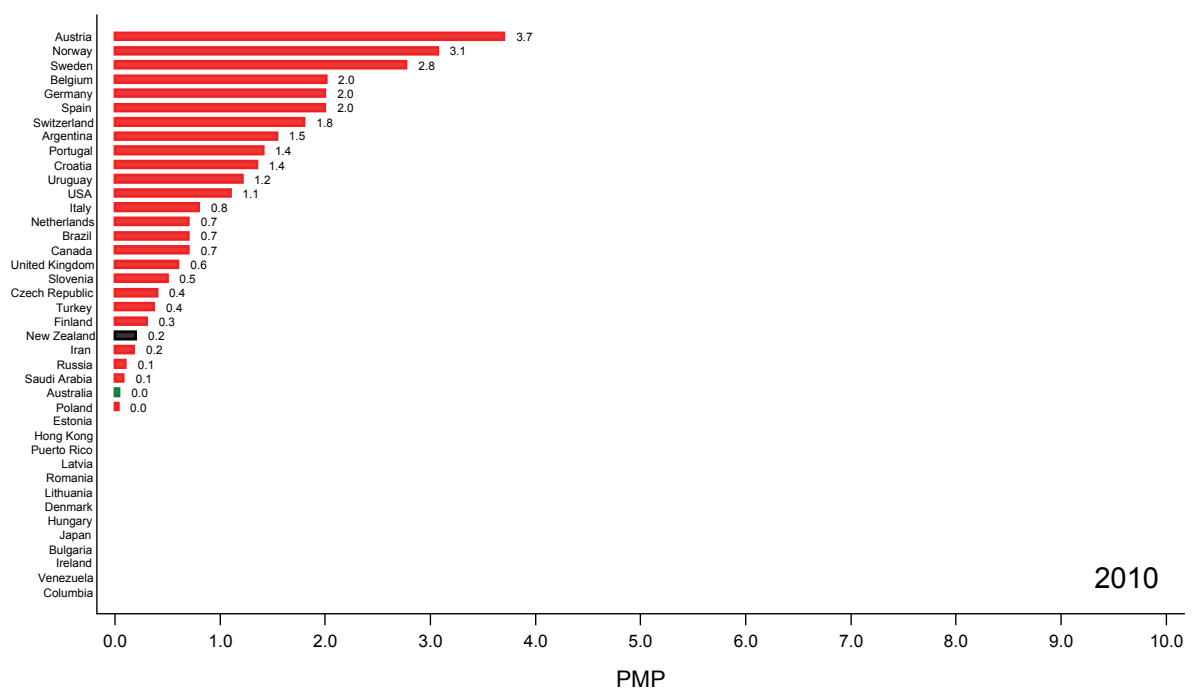
International comparisons

Figure 2.24 International Transplantation Rates, Pancreas 2011



2011

Figure 2.25 International Transplantation Rates, Pancreas 2010



2010

Data sourced July 31, 2014 from IRODaT website <http://www.irodat.org>

Chapter 3

Pathway of Organ Donation



in Australia and New Zealand



Pathway of Organ Donation

This chapter reports on the organ donation pathway from identification of a donor to the outcome of the donation. This includes the known intention to be an organ donor; cause of death and events leading up to admission to hospital; whom authority to donate was

sought by; whether the donation did not proceed or proceeded down donation after brain death or donation after circulatory death pathway; maintenance and terminal treatment of the donor and outcome of the retrieval procedure resulting in transplantation of donated organs.

Donor Intention

Figures 3.1 and 3.2 show whether the donor had recorded an intention to donate through indication on their driver's licence. In 2013, 19% (76) of Australian organ donors and 3% (one) of New Zealand organ donors had indicated their intention to be an organ donor on their driver's licence.

Figure 3.3 shows the number of donors enrolled on the Australian Organ Donation Registry, which commenced in 2000.

Figure 3.1

Driver's Licence Intention Status 2009 - 2013										
Intention	Australia					New Zealand				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Yes	73 (30%)	85 (28%)	80 (24%)	77 (22%)	76 (19%)	7 (16%)	5 (12%)	4 (11%)	3 (8%)	1 (3%)
Not Applicable *	49	126	113	158	153	3	0	3	3	2
No	31	31	45	38	77	0	0	1	2	2
Unknown	94	67	99	81	85	33	36	30	30	31
Total	247	309	337	354	391	43	41	38	38	36

* 'Not Applicable' is recorded for those donors who do not poses an Australian or New Zealand drivers licence (for example infants, students or those adults chose not to obtain a drivers licence)

Figure 3.2

Australian States 2013 (2012) Driver's Licence Intention Status								
Intention	QLD	NSW	ACT	VIC	TAS	SA	NT	WA
Yes	2 (5)	48 (51)	2 (4)	2 (4)	1 (0)	20 (11)	0 (1)	1 (1)
Not Applicable *	70 (69)	11 (7)	2 (3)	38 (41)	1 (8)	2 (2)	3 (1)	26 (27)
No	4 (2)	34 (23)	2 (5)	9 (0)	2 (0)	6 (1)	3 (4)	17 (3)
Unknown	1 (2)	9 (7)	0 (0)	61 (47)	4 (7)	6 (15)	1 (2)	3 (1)
Total	77 (78)	102 (88)	6 (12)	110 (92)	8 (15)	34 (29)	7 (8)	47 (32)

Pathway of Organ Donation



Figure 3.3

Donors Enrolled on the Australian Organ Donor Registry 2013 (2012)									
	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST
Yes	20 (28)	31 (31)	3 (7)	21 (16)	4 (6)	15 (5)	2 (3)	17 (14)	113 (110)
Not Applicable	7 (4)	7 (3)	0 (1)	2 (6)	0 (1)	0 (0)	0 (1)	9 (3)	25 (19)
No	0 (1)	2 (0)	0 (0)	1 (0)	0 (1)	1 (2)	0 (0)	0 (1)	4 (5)
Not Registered	47 (42)	61 (51)	3 (4)	82 (67)	4 (6)	18 (22)	5 (4)	21 (13)	241 (209)
Not Accessed	3 (3)	1 (3)	0 (0)	4 (3)	0 (1)	0 (0)	0 (0)	0 (1)	8 (11)
Unknown	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	77 (78)	102 (88)	6 (12)	110 (92)	8 (15)	34 (29)	7 (8)	47 (32)	391 (354)

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. <http://www.medicareaustralia.gov.au/provider/patients/aodr/index.jsp>

Coroner's Cases

In Australia, 48% of donors in 2013 were subject to Coronial inquiry, compared to 43% in 2012. In New Zealand it was 28% for 2013 and 50% in 2012.

Figure 3.4

Coroner's Cases 2009 - 2013										
	Australia					New Zealand				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Yes	106	121	141	153	187	19	18	16	19	10
No	141	188	196	201	204	24	23	22	19	26
Total	247	309	337	354	391	43	41	38	38	36

Figure 3.5

Australian Coroner's Cases by State 2013 (2012)										
	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
Yes	42 (39)	44 (34)	3 (6)	44 (34)	6 (7)	17 (13)	5 (2)	26 (18)	187 (153)	10 (19)
No	35 (39)	58 (54)	3 (6)	66 (58)	2 (8)	17 (16)	2 (6)	21 (14)	204 (201)	26 (19)
Total	77 (78)	102 (88)	6 (12)	110 (92)	8 (15)	34 (29)	7 (8)	47 (32)	391 (354)	36 (38)



Pathway of Organ Donation

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 2009 - 2013, CVA accounted for an overall 48% of donor deaths and road trauma 12%.

Figure 3.6 shows the cause of death by percentage in Australia and each Australian State and New Zealand over the last 5 years.

Figure 3.7 shows that in 2013, CVA was the main cause of death in donors 35-54 years and 55 years and older, in both Australia and New Zealand, whereas in the younger 15-34 year age group and 14 years and younger, Hypoxia-Anoxia accounted for 26% of all deaths in Australia and 17% in New Zealand .

The cause of death by age group is shown in Figure 3.8 for each Australian State for 2013.

Figure 3.6

Cause of Donor Death by State/Country 2009 - 2013										
	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
CVA	44%	46%	55%	51%	50%	54%	52%	45%	48%	52%
Trauma (road)	16%	12%	16%	7%	5%	10%	17%	18%	12%	15%
Trauma (non-road)	13%	12%	5%	7%	185	10%	9%	95%	10%	10%
Hypoxia-Anoxia	20%	23%	23%	29%	16%	20%	13%	21%	23%	16%
Cerebral Tumour	1%	1%	0%	0%	0%	0%	0%	1%	1%	1%
Other	6%	5%	2%	6%	11%	6%	9%	6%	6%	6%

Figure 3.7

Cause of Donor Death by Age Group 2013										
	Australia					New Zealand				
	Age Groups				Total	Age Groups				Total
	0-14	15-34	35-54	>=55		0-14	15-34	35-54	>=55	
CVA	2	11	64	101	178 (46%)	0	3	14	9	26 (72%)
Trauma (road)	4	24	10	7	45 (12%)	0	1	0	0	1 (3%)
Trauma (non-road)	0	16	8	18	42 (11%)	1	0	0	1	2 (6%)
Hypoxia-Anoxia	9	41	30	23	103 (26%)	1	3	2	0	6 (17%)
Cerebral Tumour	0	0	2	0	2 (1%)	0	0	0	0	0 (0%)
Other	3	9	5	4	21 (5%)	0	0	1	0	1 (3%)
Total	18	101	119	153	391	2	7	17	10	36

Pathway of Organ Donation



Figure 3.8

Australian States Cause of Death by Age Group 2013						
		Age Groups				Total
		0-14	15-34	35-54	>=55	
Queensland	CVA	1	4	15	15	35
	Trauma (road)	1	7	1	1	10
	Trauma (non-road)	0	0	2	4	6
	Hypoxia-Anoxia	3	11	6	1	21
	Other	0	3	1	1	5
	Total	5	25	25	22	77
New South Wales	CVA	1	1	16	23	41
	Trauma (road)	2	7	5	2	16
	Trauma (non-road)	0	5	4	6	15
	Hypoxia-Anoxia	0	12	6	7	25
	Other	1	0	3	1	5
	Total	4	25	34	39	102
Australian Capital Territory (ACT)	CVA	0	0	1	2	3
	Trauma (road)	0	1	0	0	1
	Trauma (non-road)	0	0	0	1	1
	Hypoxia-Anoxia	0	0	1	0	1
	Other	0	0	0	0	0
	Total	0	1	2	3	6
Victoria	CVA	0	2	15	38	55
	Trauma (road)	0	1	1	2	4
	Trauma (non-road)	0	2	1	5	8
	Hypoxia-Anoxia	3	10	12	12	37
	Other	0	3	1	2	6
	Total	3	18	30	59	110
Tasmania	CVA	0	0	1	3	4
	Trauma (road)	0	0	0	0	0
	Trauma (non-road)	0	2	0	0	2
	Hypoxia-Anoxia	0	1	0	0	1
	Other	0	0	1	0	1
	Total	0	3	2	3	8
South Australia	CVA	0	2	2	14	18
	Trauma (road)	0	2	1	1	4
	Trauma (non-road)	0	4	0	1	5
	Hypoxia-Anoxia	0	2	1	2	5
	Other	0	2	0	0	2
	Total	0	12	4	18	34
Northern Territory	CVA	0	1	2	0	3
	Trauma (road)	0	1	0	0	1
	Trauma (non-road)	0	0	1	0	1
	Hypoxia-Anoxia	0	0	1	0	1
	Other	0	1	0	0	1
	Total	0	3	4	0	7
Western Australia	CVA	0	1	12	6	19
	Trauma (road)	1	5	2	1	9
	Trauma (non-road)	0	3	0	1	4
	Hypoxia-Anoxia	3	5	3	1	12
	Other	2	0	1	0	3
	Total	6	14	18	9	47



Pathway of Organ Donation

Cardiopulmonary Resuscitation

Cardiopulmonary resuscitation is recorded for events leading up to the admission and hospital stay for the patient, prior to organ donation (Figures 3.9 and 3.10).

Figure 3.9

Cardiopulmonary Resuscitation 2009 - 2013										
	Australia					New Zealand				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Yes	89	112	111	130	155	13	15	13	14	8
No	158	197	226	224	234	30	26	25	24	27
Unknown	0	0	0	0	2	0	0	0	0	1
Total	247	309	337	354	391	43	41	38	38	36

Figure 3.10

Australian States Cardiopulmonary Resuscitation by State 2013 (2012)								
	QLD	NSW	ACT	VIC	TAS	SA	NT	WA
Yes	31 (27)	42 (32)	1 (2)	47 (38)	3 (3)	7 (10)	4 (3)	20 (15)
No	46 (51)	59 (56)	5 (10)	63 (54)	5 (12)	27 (19)	3 (5)	26 (17)
Unknown	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
Total	77 (78)	101 (88)	6 (12)	110 (92)	8 (15)	34 (29)	7 (8)	47 (32)

Pathway of Organ Donation



Authority Sought for Organ Donation

The predominant group requesting authority for organ donation in 2013 were the Intensive Care Clinicians and Registrars, 65% in Australia and 78% in New Zealand shown in Figure 3.11.

In Australia, authority for organ donation was sought by donor coordinators on 21 occasions, which is a marked increase from previous years (Figure 3.11). Authority for organ donation in New Zealand was sought by a donor coordinator in only one case.

See Figure 3.12 for individual State and Territory statistics.

In 2013, 25% of families volunteered authority for organ donation in Australia, down 6%, compared to 31% in 2012 (Figure 3.11).

In New Zealand, 14% volunteered authority in 2013 compared to 5% in 2012 and 13% in 2011.

Figure 3.11

Authority to Donate 2009 - 2013										
	Australia					New Zealand				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
ICU Clinician	147	200	179	214	241	31	29	30	33	28
ICU Registrar	4	13	18	15	13	2	1	1	1	0
Emergency Consultant/Registrar	2	9	14	7	8	0	0	0	0	0
Other Physicians/Anaesthetist	0	0	1	2	1	2	1	2	2	2
Donor Coordinator	2	2	1	1	21	0	0	0	0	1
Volunteered by Family	90	82	123	110	99	7	9	5	2	5
Drivers Licence - No Family	0	0	0	1	0	0	0	0	0	0
Nursing Staff - Social Worker	2	2	1	4	2	1	1	0	0	0
Accident and Emergency Staff	0	0	0	0	0	0	0	0	0	0
Unknown	0	1	0	0	0	0	0	0	0	0
Total	247	309	337	354	391	43	41	38	38	36

Figure 3.12

Authority to Donate by State 2013 (2012)								
	QLD	NSW	ACT	VIC	TAS	SA	NT	WA
ICU Clinician	41 (41)	76 (69)	4 (7)	61 (41)	3 (9)	28 (20)	7 (8)	21 (19)
ICU Registrar	0 (2)	2 (2)	0 (0)	5 (6)	0 (0)	1 (2)	0 (0)	5 (3)
Emergency Consultant/Registrar	1 (0)	3 (2)	0 (0)	2 (4)	0 (0)	0 (0)	0 (0)	2 (1)
Other Physicians/Anaesthetist	0 (0)	1 (0)	0 (0)	0 (2)	0 (0)	0 (0)	0 (0)	0 (0)
Donor Coordinator	3 (0)	15 (0)	1 (0)	0 (0)	0 (0)	1 (0)	0 (0)	1 (1)
Volunteered by Family	31 (35)	4 (14)	0 (4)	42 (37)	3 (6)	3 (7)	0 (0)	16 (7)
Drivers Licence - No Family	0 (0)	0 (1)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Nursing Staff - Social Worker	0 (0)	0 (0)	0 (1)	0 (2)	1 (0)	0 (0)	0 (0)	1 (1)
Accident and Emergency Staff	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Total	76 (78)	101 (88)	5 (12)	110 (92)	7 (15)	33 (29)	7 (8)	46 (32)



Pathway of Organ Donation

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 or infection. In 2013, as with previous years, the main reason donors do not proceed to organ donation was because the time to cardiac standstill for DCD was exceeded.

Figure 3.13 represents the number of non-proceeding 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 78 donors who did not proceed down the pathway of solid organ donation and reasons for this are described in Figure 3.14.

In New Zealand there were 2 intended donors.

Figure 3.13

Actual vs Intended (Non - Proceeding) Donors 2013										
	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUS	NZ
Intended Donor	16 (17%)	20 (16%)	-	32 (23%)	1 (11%)	6 (15%)	-	3 (6%)	78 (17%)	2 (5%)
Actual Donor	77 (83%)	102 (84%)	6 (100%)	110 (77%)	8 (89%)	34 (85%)	7 (100%)	47 (94%)	391 (83%)	36 (95%)

Figure 3.14

Reasons Why Donation Did Not Proceed 2013	
Australia and New Zealand	
Did not proceed to cardiac standstill (DCD donors)	23
Disease of organs diagnosed	22
No suitable recipients on waiting list	12
Medically unsuitable results	7
Extended ischaemic time	5
Consent withdrawn by donor family	3
Infection in donor	3
Malignancy in donor	3
Total Non-Proceeding Donors	78

Pathway of Organ Donation

Donation After Circulatory Death

Australia

The majority of organs are donated by donation after brain death (DBD) donors. After certification of brain death, the donor remains on the ventilator and the removal of organs may occur many hours later.

Donation after circulatory death (DCD) donors are defined as patients of 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 449 donors for Australia.

In 2013 there were 86 DCD donors; 35 in Victoria, 24 in Queensland, 15 in New South Wales, five in Western Australia, three in Tasmania and two each in South Australia and Northern Territory (Figure 3.15).

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

In 2013, the mean age for a DCD donor was 45.4 years and the age range was 1.3 years to 74.5 years.

Causes of death leading to donation after circulatory death in 2013 were CVA (26), hypoxia-anoxia (38), road trauma (9), other trauma (6) and other causes (7).

Of the 86 actual DCD donors in 2013 nine donors did not have any donated organs transplanted. All nine donors did, however, become tissue donors.

There were 50 intended DCD donors during 2013. The reasons these donors did not proceed to the retrieval procedure include 23 donors who did not reach cardiac standstill, 14 donors identified with disease of organs, extended ischaemic times in four donors, no suitable recipients for three donors, two medically unsuitable, a further two donors were discovered to have malignancy, one had consent withdrawal and one had infection.

New Zealand

There were 2 DCD donors in New Zealand in 2013 however no organs were utilised from these donors.

Figure 3.15

Donation After Circulatory Death by State/Country 2009 - 2013										
YEAR	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
2009	5	15	2	17	0	3	0	0	42	2
2010	13	24	3	24	0	5	0	0	69	1
2011	18	18	2	32	0	8	1	7	86	2
2012	16	19	2	30	0	4	1	5	77	0
2013	24	15	0	35	3	2	2	5	86	2



Pathway of Organ Donation

Time from Admission to Brain Death

Australia

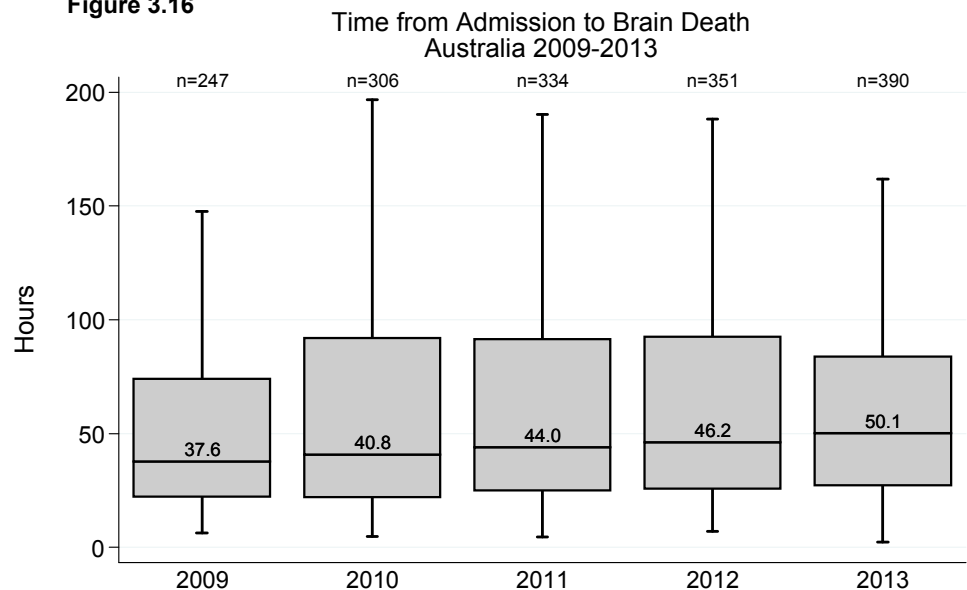
In 2013, 18% of Australian donors were declared brain dead within 23 hours of hospital admission.

Time of admission to hospital was unknown in only one donor.

The median time from admission to brain death was 50.1 hours.

Fifteen percent (60 donors) were in hospital for more than five days.

Figure 3.16



New Zealand

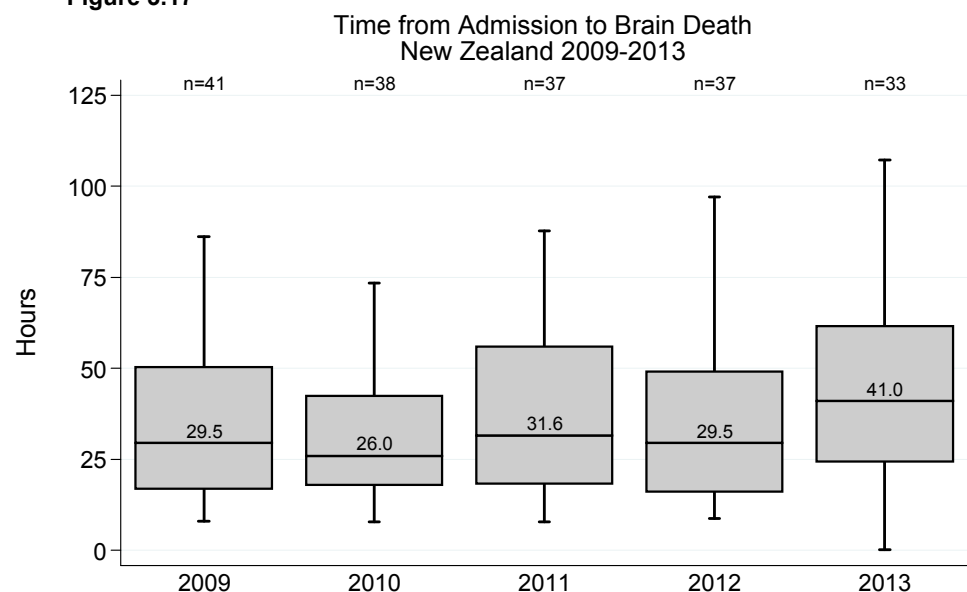
In 2013, 22% of New Zealand donors were declared brain dead within 23 hours of hospital admission.

Time of admission to hospital was unknown in three donors.

The median time from admission to brain death was 41.0 hours.

Eight percent (three donors) were in hospital for more than five days.

Figure 3.17



* For DCD donors, this is the time from admission to circulatory death

** Excluded from analysis are donors in Australia and New Zealand where no admission date was reported.

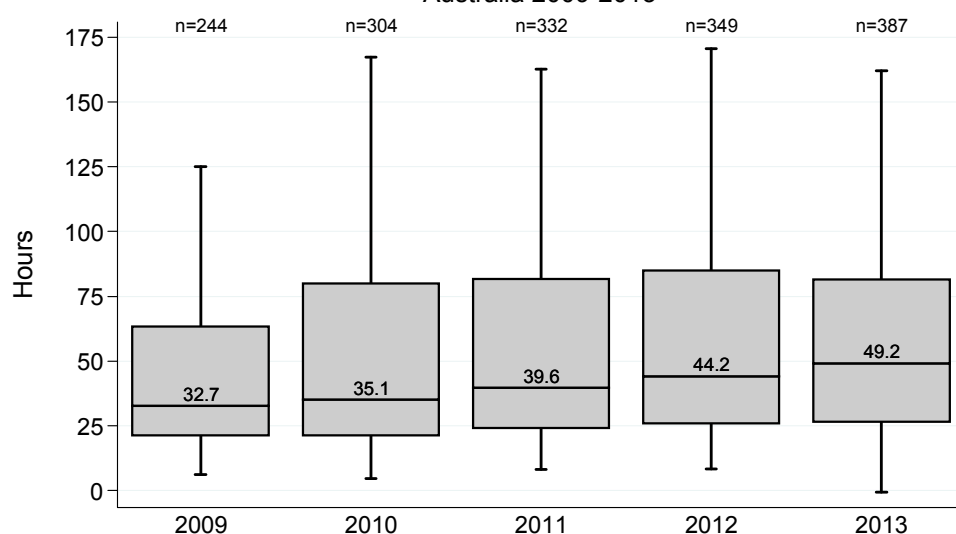
Pathway of Organ Donation



Time from ventilation to Brain Death

Figure 3.18

Time from Ventilation to Brain Death
Australia 2009-2013



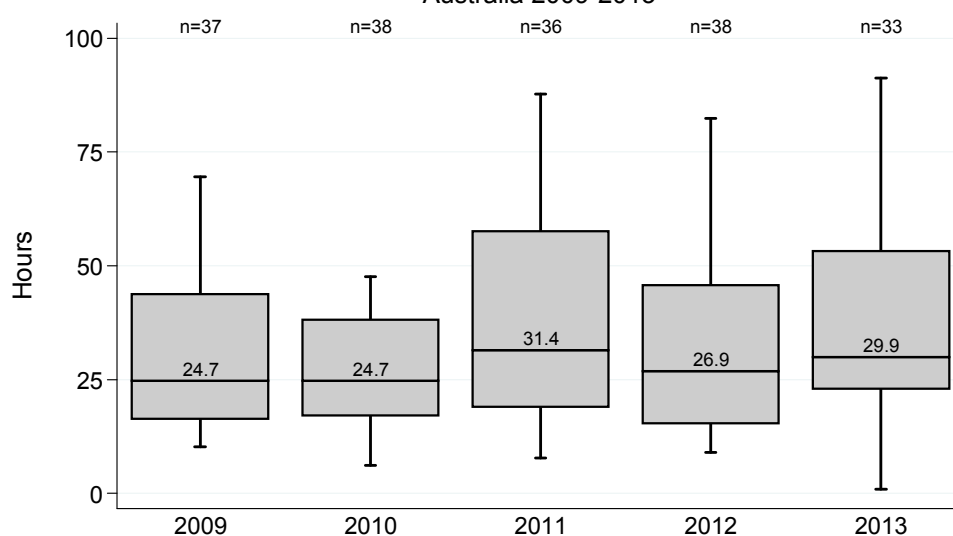
Australia

In 2013, the median time from ventilation to brain death was 49.2 hours.

Time of ventilation was unknown in four Australian donors.

Figure 3.19

Time from Ventilation to Brain Death
Australia 2009-2013



New Zealand

The median time in New Zealand from ventilation to brain death was 29.9 hours.

Time of ventilation was unknown in three New Zealand donors.

* For DCD donors, this is the time from ventilation to circulatory death

** Excluded from analysis were donors in Australia and New Zealand with no ventilation date reported.



Pathway of Organ Donation

Time From Brain Death to Aortic Cross Clamp

Figure 3.20

Australia

In 2013, 38 heart beating donors (12%) had undergone aortic cross clamp within twelve hours of the certification of brain death.

The median time was 17.3 hours.

Cross clamp of donor did not proceed in five Australian donors.

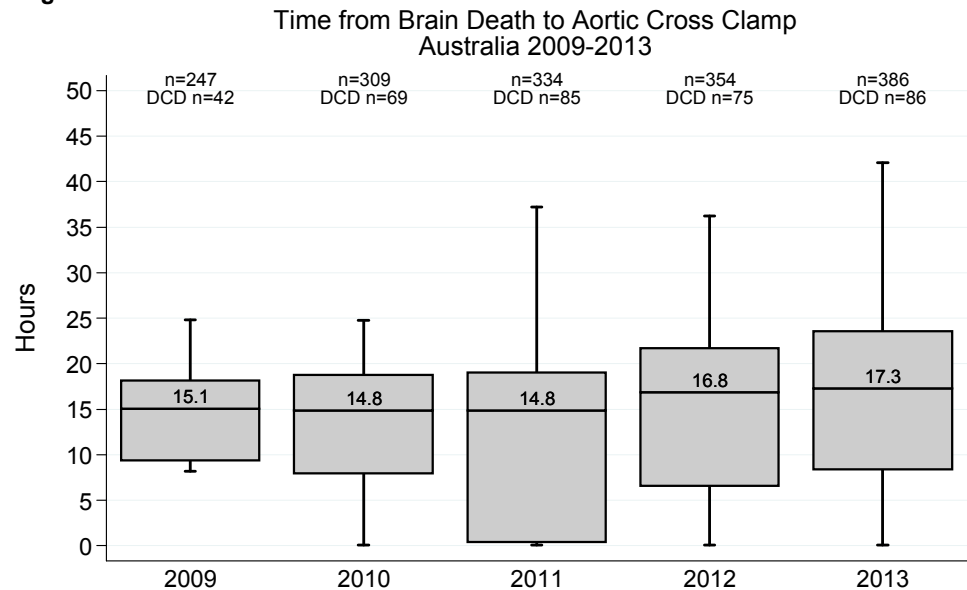
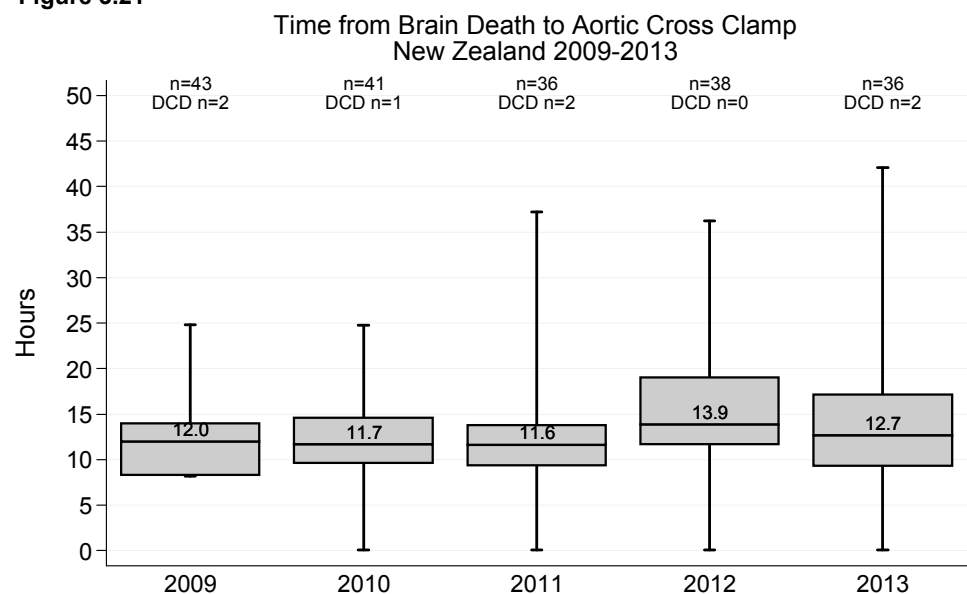


Figure 3.21

New Zealand

In 2013, 16 heart beating donors (47%) had undergone aortic cross clamp within twelve hours of the certification of brain death.

The median time was 13.0 hours.



* For DCD donors, this is the time from circulatory death to time of cold perfusion

Pathway of Organ Donation



Donor Maintenance

Maintenance medication of the donor (given in the intensive care/critical care unit)

Australia

There were 37 donors (9%) who did not require maintenance drug support in 2013.

Antidiuretic agents (desmopressin/vasopressin) were prescribed to 59% (229) of all donors.

MAP <50 mm Hg

Mean arterial blood pressure (MAP) <50 mmHg was recorded in 5.4% (21) of donors in Australia in 2013. Five donors had a duration of less than one hour and 15 donors had one hour or longer (one donor had no reported duration of MAP <50mmHg). The range was 36 minutes to 5 hours.

New Zealand

In 2013 there was only one donor who did not require inotropic support.

Antidiuretic agents were prescribed to 64% (23) of all donors.

MAP <50 mmHg

One donor was reported with a mean arterial blood pressure (MAP) <50 mmHg with a duration of one hour.

Terminal Treatment (medication provided in the operating theatre)

Australia

There were 58 donors who did not receive any heparin as part of their terminal treatment in 2013. Forty seven of those donors were DCD (donation after circulatory death) donors.

Forty five donors did not receive any terminal treatment; 40 of those were DCD donors.

New Zealand

There were two donors who did not receive any heparin and only one donor who did not receive any drugs as part of their terminal treatment in 2013. This was a heart beating donor.



Pathway of Organ Donation

Summary - Organs Requested, Consent Given, Retrieved and Transplanted

The information reported here, 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.

For further details see Supplement 1 - for Australia and Supplement 2 - for New Zealand.

Figure 3.22 shows the outcome of organs requested in 2013 (2012).

Figure 3.22

Outcome Following Request for Organ Donation by Organ Type 2013 (2012)							
		Kidneys	Liver	Heart	Lungs	Pancreas	Stomach/ Intestines
Australia	Requested	760 (690)	360 (334)	270 (258)	690 (622)	299 (266)	57 (40)
	Consent Given	758 (688)	357 (329)	257 (247)	654 (610)	289 (258)	48 (35)
	Retrieved	691 (636)	243 (218)	92 (77)	337 (303)	68 (70)	0 (1)
	Recipients Transplanted	630 (607)	252 (230)	79 (76)	167 (144)	+34 (+42)	0 (1)
New Zealand	Requested	68 (74)	35 (37)	20 (30)	54 (66)	12 (22)	0 (0)
	Consent Given	68 (72)	35 (36)	19 (28)	54 (62)	12 (22)	0 (0)
	Retrieved	61 (57)	25 (30)	9 (12)	36 (28)	0 (3)	0 (0)
	Recipients Transplanted	55 (56)	26 (32)	9 (12)	18 (14)	0 (3)	0 (0)
Kidneys and lungs are counted as two separate organs (i.e. left and right) + Includes (1) 2013 and (4) 2012 pancreas islet transplants							

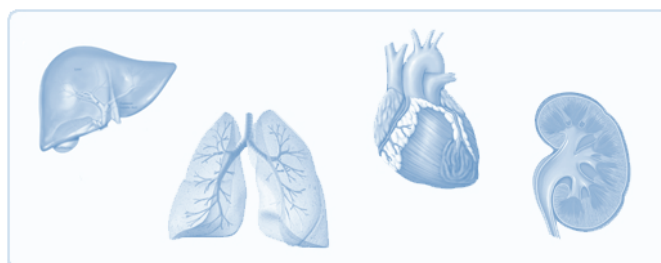
Organs Requested

The requests for specific organs in Australia in 2013 from 391 organ donors were: kidneys 97.2%, liver 92.1%, heart 69.1%, lungs 88.2% and pancreas 76.5%.

From the 36 New Zealand donors in 2013, the requests for specific organs were: kidneys 94.4%, liver 97.2%, heart 55.6%, lungs 75% and pancreas 33.3%.

Pathway of Organ Donation

Organs Retrieved



The organs retrieved in each donor state retrieval team are detailed in the Supplement 1 - Australia and Supplement 2 - New Zealand, at the end of this report.

Of all organs retrieved in Australia only 5% (70) were not used and 3% (43) went to research. Of those used for research the majority (26) were pancreas/pancreas islets. 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.

Multiple Organ Retrieval

There were 86 (22%) Australian donors in 2013 who had a single organ retrieved and transplanted, shown in Figure 3.23. Kidney only donation occurred in 67 cases.

Sixteen donors in Australia went to theatre, but no solid organs were retrieved.

New Zealand had nine (25%) single organ donors in 2013, four donating kidneys, three donating a liver and two donating lungs.

In Australia, 74% (289) of donors and 5% (27) of donors in New Zealand had two or more organs retrieved for the purpose of transplantation.

Figure 3.23

Multiple Organ Retrieval 2009 - 2013										
Number of Organs	Australia					New Zealand				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
No organs	7 (3%)	7 (2%)	8 (2%)	12 (3%)	16 (4%)	2 (5%)	3 (7%)	3 (8%)	4 (11%)	0 (0%)
Single	43 (17%)	60 (19%)	89 (26%)	87 (25%)	86 (22%)	7 (16%)	9 (22%)	4 (11%)	5 (13%)	9 (25%)
Two	55 (22%)	98 (32%)	97 (29%)	107 (30%)	120 (31%)	15 (35%)	12 (29%)	10 (26%)	12 (32%)	13 (36%)
Three	60 (24%)	61 (20%)	75 (22%)	76 (21%)	100 (26%)	14 (33%)	12 (29%)	16 (42%)	8 (21%)	8 (22%)
Four	47 (19%)	54 (17%)	45 (13%)	50 (14%)	50 (13%)	4 (9%)	5 (12%)	5 (13%)	9 (24%)	6 (17%)
Five	35 (14%)	29 (9%)	23 (7%)	22 (6%)	19 (5%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

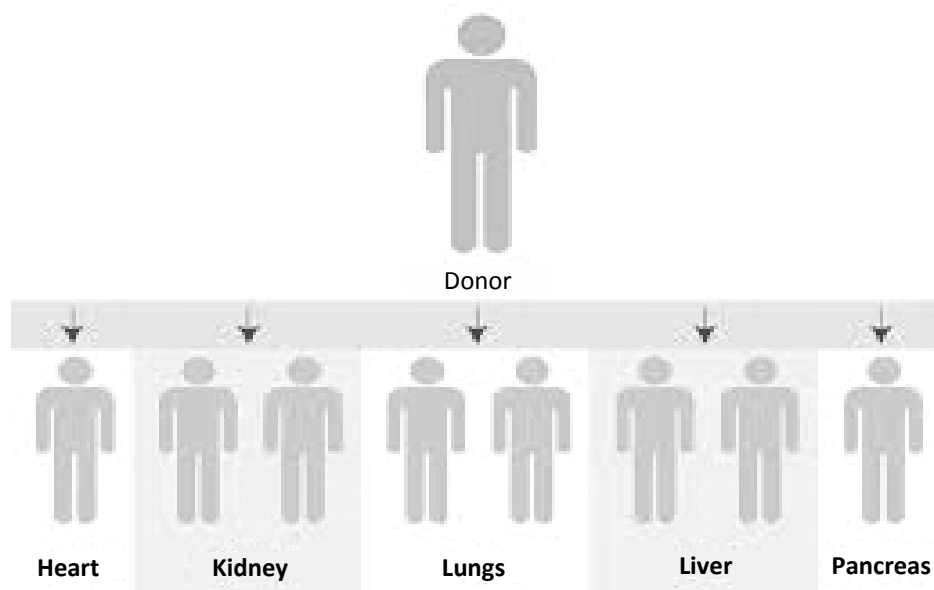


Pathway of Organ Donation

Figure 3.24

Comparison of Multiple Organ Retrieval by State/Country 2013										
Number Of Organs	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
No organs	6 (8%)	7 (7%)	0 (0%)	3 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	16 (4%)	0 (0%)
One	17 (22%)	25 (25%)	1 (17%)	26 (24%)	1 (13%)	5 (15%)	2 (29%)	9 (19%)	86 (22%)	9 (25%)
Two	26 (34%)	26 (25%)	2 (33%)	34 (31%)	3 (38%)	14 (41%)	2 (29%)	13 (28%)	120 (31%)	13 (36%)
Three	17 (22%)	21 (21%)	1 (17%)	32 (29%)	3 (38%)	6 (18%)	1 (14%)	19 (40%)	100 (26%)	8 (22%)
Four	9 (12%)	18 (18%)	0 (0%)	10 (9%)	1 (13%)	5 (15%)	2 (29%)	5 (11%)	50 (13%)	6 (17%)
Five	2 (3%)	5 (5%)	2 (33%)	5 (5%)	0 (0%)	4 (12%)	0 (0%)	1 (2%)	19 (5%)	0 (0%)

For the above donor counts, 2 kidneys = 1 organ, 2 lungs = 1 organ
On occasions when only one kidney or one lung is retrieved, this is also defined as one organ



One donor can benefit the lives of a number of recipients suffering end stage organ disease.

Chapter 4

Donor Profile



in Australia and New Zealand



Donor Profile

This chapter contains a more detailed description of organ donors in Australia 2013 compared to 2012 (Fig 4.1). Key observations are the gender discrepancy for

DCD donors (where there are greater numbers of males than females). There is a preponderance of Caucasian donors, and the distribution of blood groups (largely O and A).

Figure 4.1

Demographics of Deceased Donors in Australia 2012 - 2013						
	2012			2013		
	DBD	DCD	Total	DBD	DCD	Total
Gender						
Male	144(52%)	57(74%)	201 (57%)	158(52%)	48(56%)	206 (53%)
Female	133(48%)	20(26%)	153 (43%)	147(48%)	38(44%)	185 (47%)
Age						
0-4	3(1%)		3 (1%)	6(2%)	2(2%)	8 (2%)
5-14	7(3%)	1(1%)	8 (2%)	7(2%)	3(3%)	10 (3%)
15-24	39(14%)	10(13%)	49 (14%)	44(14%)	13(15%)	57 (15%)
25-34	27(10%)	5(6%)	32 (9%)	35(11%)	9(10%)	44 (11%)
35-44	39(14%)	12(16%)	51 (14%)	40(13%)	9(10%)	49 (13%)
45-54	53(19%)	22(29%)	75 (21%)	54(18%)	16(19%)	70 (18%)
55-64	59(21%)	21(27%)	80 (23%)	56(18%)	23(27%)	79 (20%)
65-74	40(14%)	6(8%)	46 (13%)	45(15%)	11(13%)	56 (14%)
75+	10(4%)		10 (3%)	18(6%)		18 (5%)
BMI (kg/m2)						
Underweight (<18.5)	12(4%)	1(1%)	13 (4%)	18(6%)	5(6%)	23 (6%)
Normal (18.5-<25)	113(41%)	32(42%)	145 (41%)	109(36%)	32(37%)	141 (36%)
Overweight(25-<30)	97(35%)	20(26%)	117 (33%)	103(34%)	33(38%)	136 (35%)
Obese(>=30)	55(20%)	24(31%)	79 (22%)	75(25%)	15(17%)	90 (23%)
Unknown					1(1%)	1 (0%)
Blood Group						
A	107(39%)	34(44%)	141 (40%)	104(34%)	36(42%)	140 (36%)
AB	12(4%)	3(4%)	15 (4%)	7(2%)	2(2%)	9 (2%)
B	32(12%)	3(4%)	35 (10%)	39(13%)	5(6%)	44 (11%)
O	126(45%)	37(48%)	163 (46%)	155(51%)	43(50%)	198 (51%)
Racial Origin						
Caucasian	258(93%)	73(95%)	331 (94%)	265(87%)	80(93%)	345 (88%)
Aboriginal	3(1%)	1(1%)	4 (1%)	6(2%)	2(2%)	8 (2%)
Asian	9(3%)	1(1%)	10 (3%)	20(7%)	2(2%)	22 (6%)
Maori	4(1%)		4 (1%)	4(1%)		4 (1%)
Pacific Islander	1(0%)	1(1%)	2 (1%)	3(1%)		3 (1%)
Other	2(1%)	1(1%)	3 (1%)	7(2%)	2(2%)	9 (2%)
Cause of Death						
CVA	152(55%)	22(29%)	174 (49%)	152(50%)	26(30%)	178 (46%)
Trauma (road)	29(10%)	9(12%)	38 (11%)	36(12%)	9(10%)	45 (12%)
Trauma (non-road)	29(10%)	8(10%)	37 (10%)	36(12%)	6(7%)	42 (11%)
Hypoxia-Anoxia	51(18%)	31(40%)	82 (23%)	65(21%)	38(44%)	103 (26%)
Cerebral Tumour	1(0%)		1 (0%)	2(1%)		2 (1%)
Other	15(5%)	7(9%)	22 (6%)	14(5%)	7(8%)	21 (5%)

Aust

Donor Profile



In New Zealand in 2013 there were two DCD donors. There was a lower proportion of donors <25 years of age, compared with Australia, but a similar proportion of donors ≥65 years of age.

Figure 4.2

Demographics of Deceased Donors in New Zealand 2012 - 2013						
	2012			2013		
	DBD	DCD	Total	DBD	DCD	Total
NZ	Gender					
	Male		17 (45%)	12(35%)	1(50%)	13 (36%)
	Female		21 (55%)	22(65%)	1(50%)	23 (64%)
	Age					
	0-4				1(50%)	1 (3%)
	5-14	2(5%)	2 (5%)	1(3%)		1 (3%)
	15-24	3(8%)	3 (8%)	1(3%)	1(50%)	2 (6%)
	25-34	3(8%)	3 (8%)	5(15%)		5 (14%)
	35-44	9(24%)	9 (24%)	6(18%)		6 (17%)
	45-54	10(26%)	10 (26%)	11(32%)		11 (31%)
	55-64	5(13%)	5 (13%)	4(12%)		4 (11%)
	65-74	4(11%)	4 (11%)	5(15%)		5 (14%)
	75+	2(5%)	2 (5%)	1(3%)		1 (3%)
	BMI (kg/m2)					
	Underweight (<18.5)			1(3%)		1 (3%)
	Normal (18.5-<25)	19(50%)	19 (50%)	14(41%)	1(50%)	15 (42%)
	Overweight(25-<30)	9(24%)	9 (24%)	15(44%)		15 (42%)
	Obese(≥30)	10(26%)	10 (26%)	4(12%)		4 (11%)
	Unknown				1(50%)	1 (3%)
	Blood Group					
	A	9(24%)	9 (24%)	14(41%)		14 (39%)
	AB	2(5%)	2 (5%)			
	B	5(13%)	5 (13%)	4(12%)	1(50%)	5 (14%)
	O	22(58%)	22 (58%)	16(47%)	1(50%)	17 (47%)
	Racial Origin					
	Caucasian	28(74%)	28 (74%)	28(82%)	1(50%)	29 (81%)
	Asian	3(8%)	3 (8%)	3(9%)		3 (8%)
	Maori	6(16%)	6 (16%)	2(6%)	1(50%)	3 (8%)
	Pacific Islander	1(3%)	1 (3%)			
	Other			1(3%)		1 (3%)
	Cause of Death					
	CVA	15(39%)	15 (39%)	26(76%)		26 (72%)
	Trauma (road)	4(11%)	4 (11%)	1(3%)		1 (3%)
	Trauma (non-road)	6(16%)	6 (16%)	1(3%)	1(50%)	2 (6%)
	Hypoxia-Anoxia	8(21%)	8 (21%)	5(15%)	1(50%)	6 (17%)
	Other	5(13%)	5 (13%)	1(3%)		1 (3%)



Donor Profile

Age and Gender Distribution in Australia and New Zealand

In Australia in 2013, 14.3% of donors (56 donors) were 65-74 years of age and 4.6% (18 donors) were aged 75 years or older. The oldest donor was 79.8 years and the youngest 1 month old (Figure 4.9).

In New Zealand in 2013, 16.7% (6 donors) were 65 years or older. The age range was from 1.9-81.5 years of age.

The mean age of donors in Australia in 2013 was 46.2 years. The mean age in New Zealand was 47.3

The mean age of donors in 1989 was 32.4 years and the age range was between 16.5 months and 69.5 years.

Figure 4.3 - 4.8 show donors according to age and gender in Australia and New Zealand for the years 2005-2007, 2008-2010 and 2011-2013.

Figure 4.3

Age and Gender of Deceased Donors
Australia 2005-2013

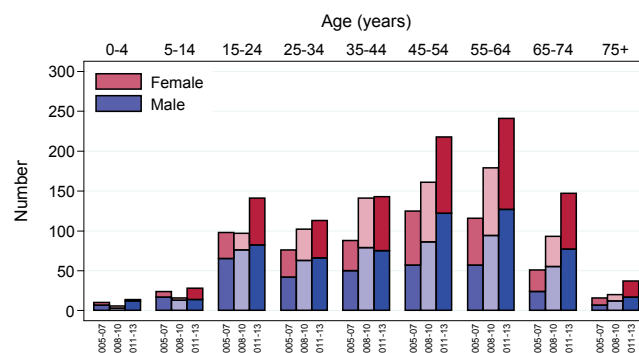


Figure 4.4

Age and Gender of Deceased Donors
New Zealand 2005-2013

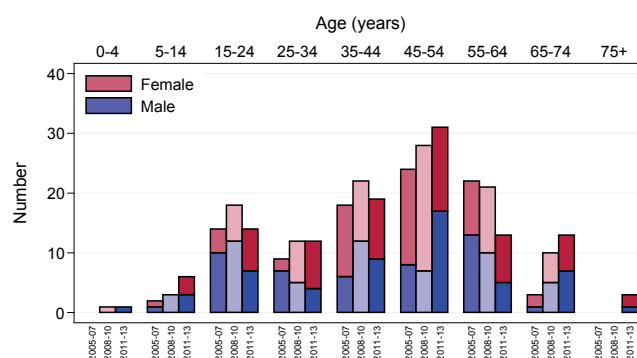


Figure 4.5

Age and Gender of Donors After Brain Death
Australia 2005-2013

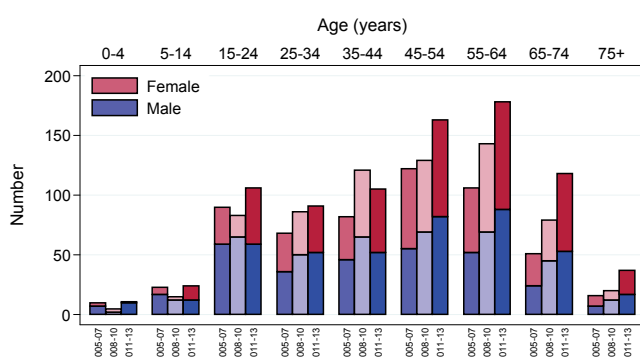


Figure 4.6

Age and Gender of Donors After Circulatory Death
Australia 2005-2013

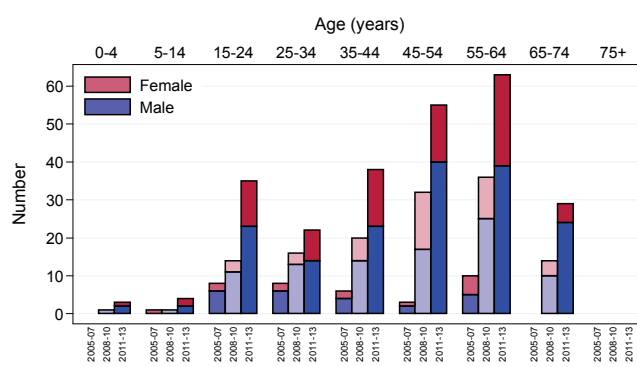


Figure 4.7

Age and Gender of Donors After Brain Death
New Zealand 2005-2013

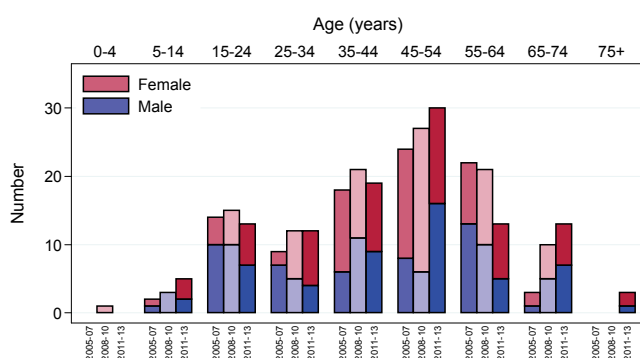
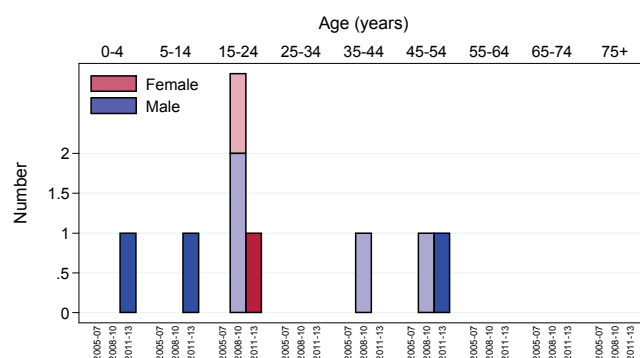


Figure 4.8

Age and Gender of Donors After Circulatory Death
New Zealand 2005-2013



Donor Profile

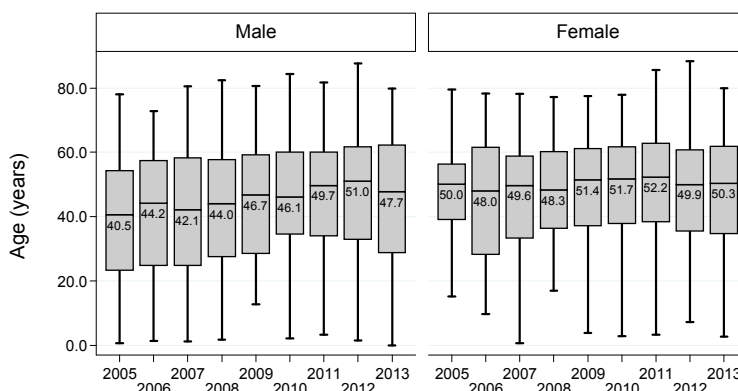
Australia

The mean age of donors for Australia in 2013 was 46.2. Across Australian States the mean age ranged from 35.7 years in Northern Territory to 51.9 years in Victoria.

The median age for Australian States in 2013 ranged from 35.5 years in Northern Territory to 55.9 years in the South Australia.

The median age for Australia in 2013 was 49.9 years.

Figure 4.9 Age of Male and Female Donors 2005-2013
Australia



New Zealand

For New Zealand the mean age of donors was 47.3 years.

The median age increased for New Zealand from 49.2 years in 2012 to 51.4 years in 2013. There was one donor aged 75 years or over (down from two in 2012) and one donor aged less than 5 years.

Figure 4.10 Age of Male and Female Donors 2005-2013
New Zealand

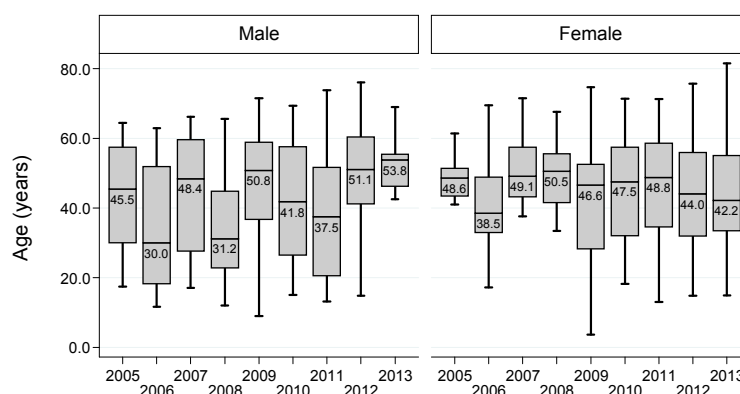
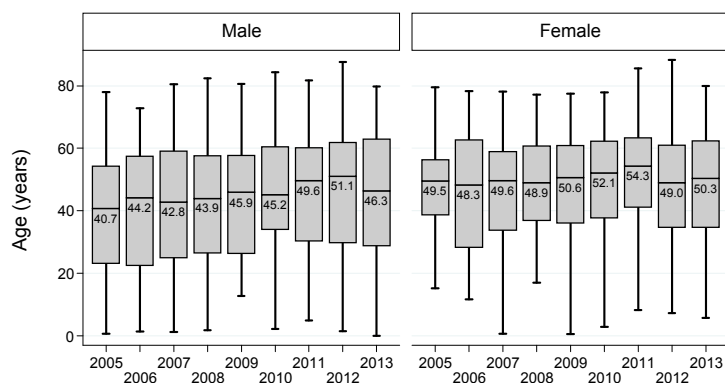


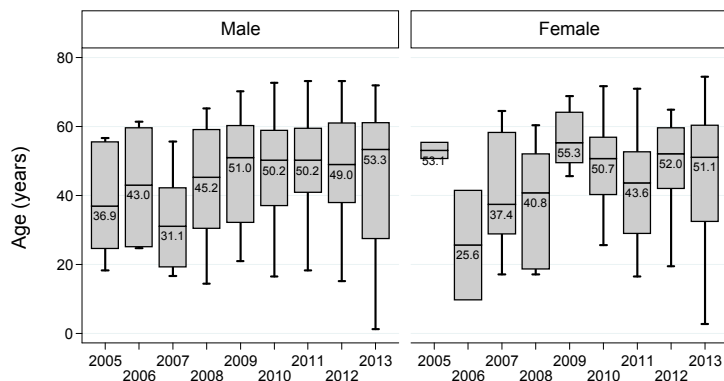
Figure 4.11 Age of Male and Female Donors After Brain Death 2005-2013
Australia



Age and gender of donors by donor pathway is shown per year from 2005 - 2013 in Figures 4.11 to 4.13.

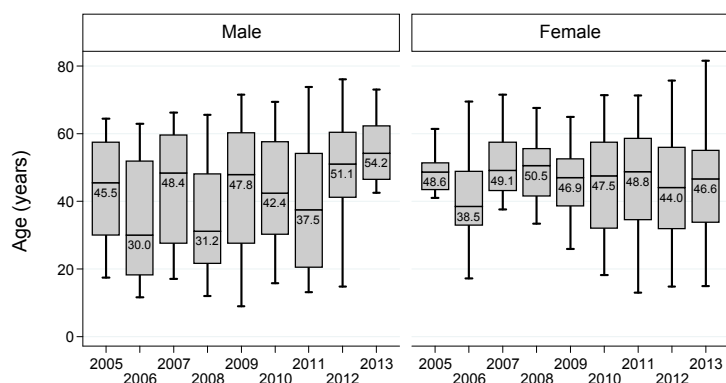


Figure 4.12 Age of Male and Female Donors After Circulatory Death 2005-2013
Australia



Figures 4.14 to 4.21 display donor age by donor pathway in each State.

Figure 4.13 Age of Male and Female Donors After Brain Death 2005-2013
New Zealand



New Zealand

Donor Profile



Figure 4.14 Age of Deceased Donors 2005-2013
Queensland

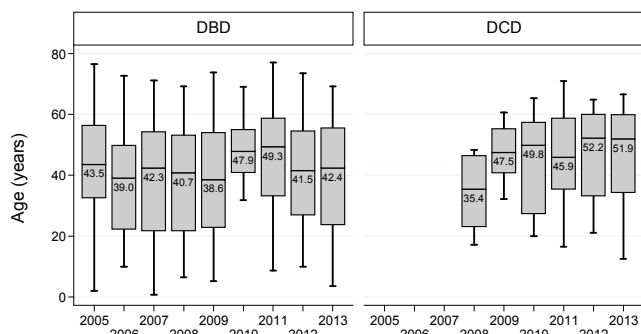


Figure 4.15 Age of Deceased Donors 2005-2013
Northern Territory

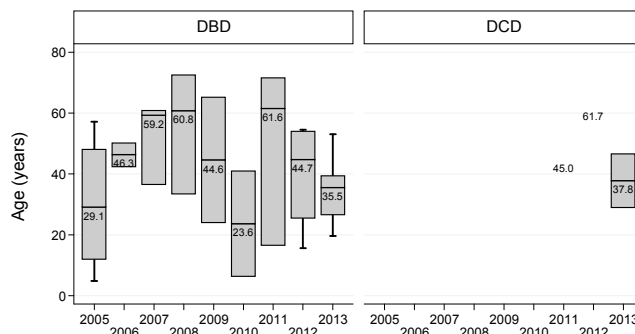


Figure 4.16 Age of Deceased Donors 2005-2013
Victoria

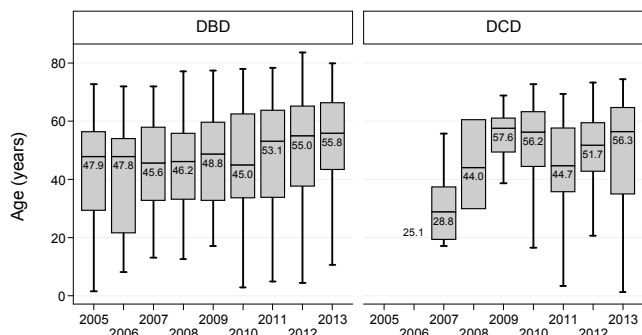


Figure 4.17 Age of Deceased Donors 2005-2013
New South Wales

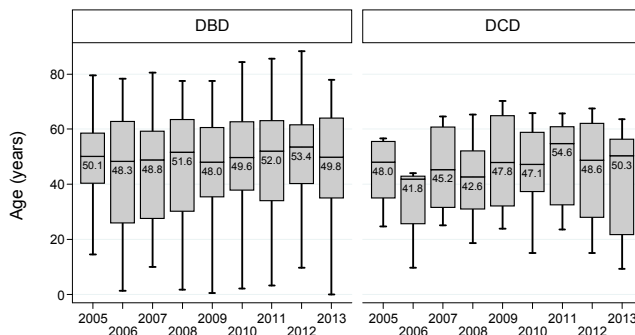


Figure 4.18 Age of Deceased Donors 2005-2013
Tasmania

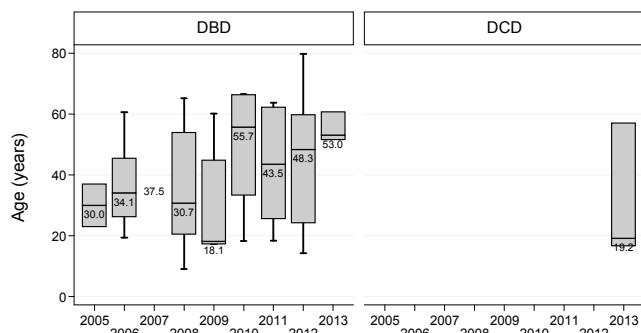


Figure 4.19 Age of Deceased Donors 2005-2013
Australian Capital Territory

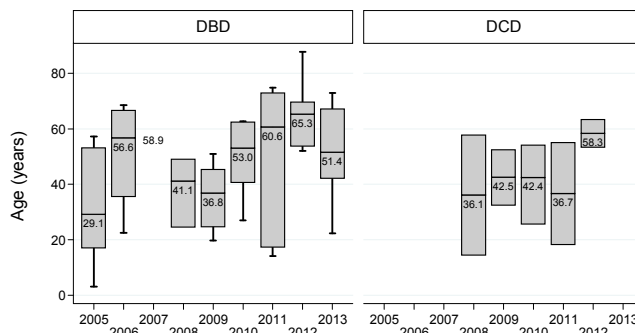


Figure 4.20 Age of Deceased Donors 2005-2013
South Australia

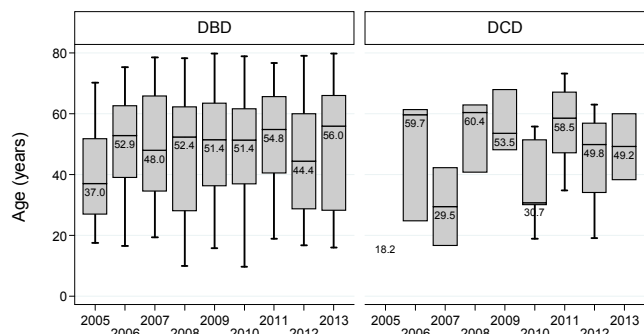
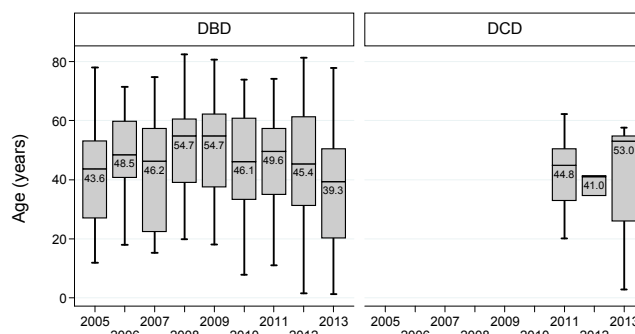


Figure 4.21 Age of Deceased Donors 2005-2013
Western Australia





Donor Profile

Donor gender in each State, Australia and New Zealand is shown in three year cohorts in Figures 4.22 to 4.25. Figures 4.23 to 4.25 also show the gender distribution taking into account the assessment criteria for donors.

Standard and extended criteria for donor suitability exist for each organ type, as specified by the Transplantation Society of Australia and New Zealand, *Organ Transplantation from Deceased Donors: Consensus Statement on Eligibility Criteria and Allocation Protocols*. <http://www.tsanz.com.au/organallocationprotocols/>

Figure 4.22

Gender by State, Australia, New Zealand
2005-2013

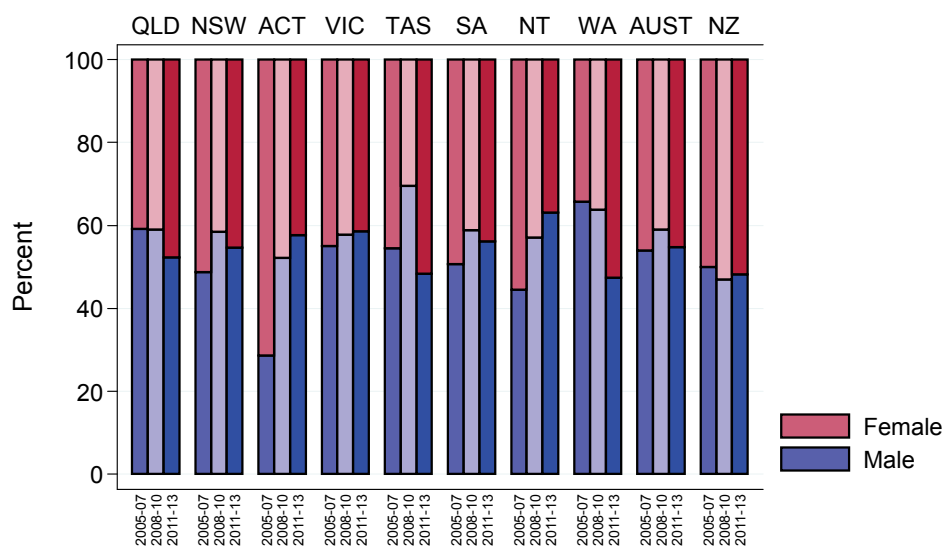
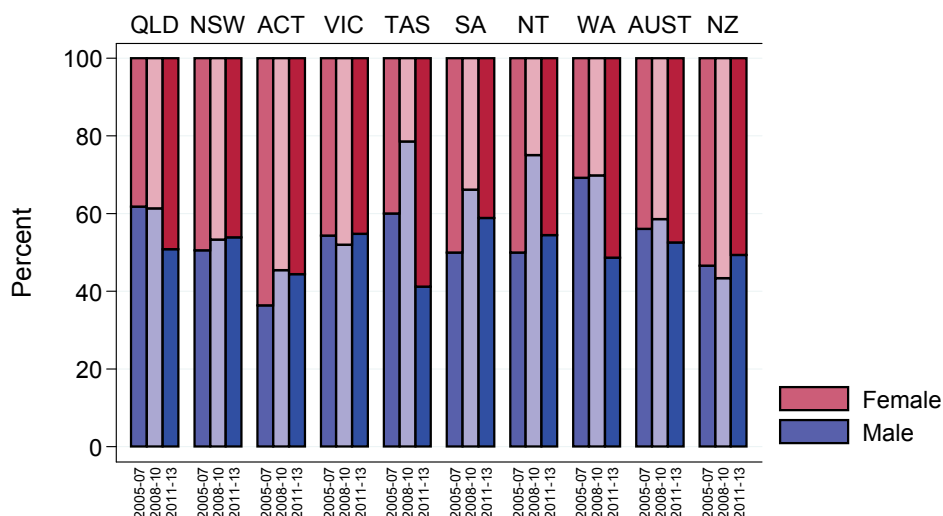


Figure 4.23

Gender by State, Australia, New Zealand
Standard Criteria Donors
2005-2013



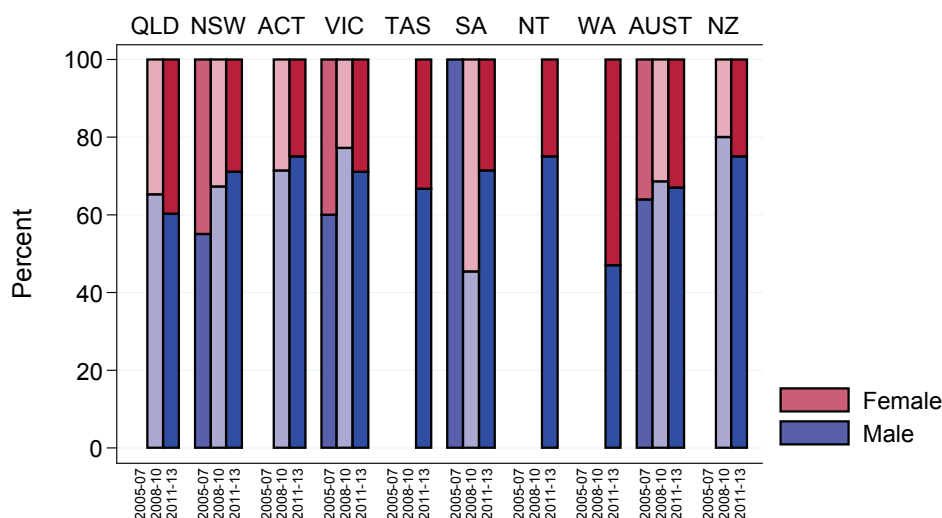
Standard criteria relate to donor characteristics associated with the best outcomes after transplantation; for example, age less than 50 years and no comorbidities.

Donor Profile



Figure 4.24

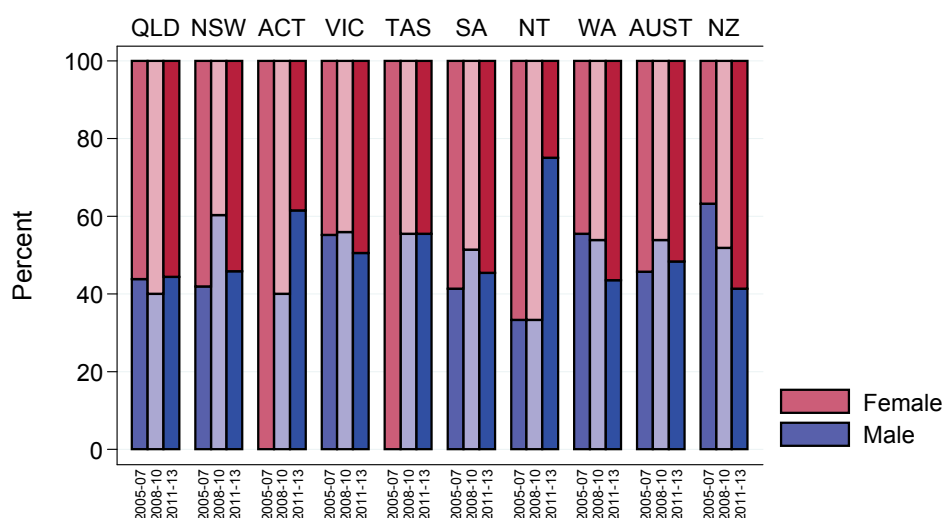
Gender by State, Australia, New Zealand
Donors After Circulatory Death
2005-2013



Donation after circulatory death (DCD), relates to 'irreversible cessation of the circulation criterion' (also known as non-heart-beating donation (NHBD)). Further details regarding the identification and management of donation after circulatory death are provided in a separate document, *National Protocol for Donation after Cardiac Death*, issued by the Australian Organ and Tissue Authority in 2010.

Figure 4.25

Gender by State, Australia, New Zealand
Expanded Criteria Donors
2005-2013



In order to increase the availability of donor organs, expanded eligibility criteria have been developed that include extended criteria for donation. These are donor characteristics that are associated with increased short and/or long-term morbidity and mortality after transplantation; for example, longer ischaemic time, comorbidities and age greater than 65 years.



The ethnic origin of donors has remained stable over the past 5 year, both in Australia and in New Zealand.

Figure 4.26

Ethnic Origin of Donors 2009 - 2013						
Donor racial/ ethnic origin	Australia			New Zealand		
	2011	2012	2013	2011	2012	2013
Caucasian	322 (96%)	331 (94%)	345 (88%)	30 (79%)	28 (74%)	29 (81%)
Aboriginal	3 (1%)	4 (1%)	8 (2%)	-	-	-
Asian	9 (3%)	10 (3%)	22 (6%)	1 (3%)	3 (8%)	3 (8%)
Maori	-	4 (1%)	4 (1%)	3 (8%)	6 (16%)	3 (8%)
Pacific Islander	1 (0%)	2 (1%)	3 (1%)	4 (11%)	1 (3%)	-
Other	2 (1%)	3 (1%)	9 (2%)	-	-	1 (3%)

The reporting of donor's religious denomination has also remained stable over the past 5 year.

Figure 4.27

Religious Denomination of Donors 2009 - 2013										
Donor Religion	Australia					New Zealand				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Christian	58 (23%)	99 (32%)	108 (32%)	108 (31%)	121 (31%)	1 (2%)	3 (7%)	7 (18%)	5 (13%)	3 (8%)
Jewish	1 (0%)	1 (0%)	-	-	3 (1%)	-	-	-	-	-
Orthodox	2 (1%)	-	3 (1%)	2 (1%)	1 (0%)	-	-	-	-	-
Muslims	1 (0%)	-	-	1 (0%)	2 (1%)	-	-	-	-	-
Buddhist	3 (1%)	1 (0%)	1 (0%)	4 (1%)	1 (0%)	-	-	-	-	-
Hindu	-	2 (1%)	-	2 (1%)	-	-	-	-	-	1 (3%)
No religion	-	-	-	-	4 (1%)	-	-	-	-	-
Other	35 (14%)	64 (21%)	75 (22%)	59 (17%)	77 (20%)	-	-	-	-	-
Unknown	147 (60%)	142 (46%)	150 (45%)	178 (50%)	182 (47%)	42 (98%)	38 (93%)	31 (82%)	33 (87%)	32 (89%)

Donor Profile



Donor Weight

The allocation of heart, lungs and livers are based in part on the matching of recipient and donor size and weight. In 2013 there were 15 donors in Australia and two donors in New Zealand who weighed less than 40 kilograms. There were 45 donors 100 kilograms and over in Australia and two in New Zealand.

Figure 4.28

Donor Weight 2009 - 2013												
		Kilograms										Total
		0-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99	100 +	
Australia	2009	2	2	0	3	11	45	56	56	35	37	247
	2010	2	5	4	2	20	43	62	70	53	48	309
	2011	3	4	1	6	31	59	73	74	48	38	337
	2012	2	4	0	7	23	73	70	85	44	46	354
	2013	10	2	3	7	24	62	95	90	53	45	391
New Zealand	2009	0	2	0	1	7	7	11	6	8	1	43
	2010	1	0	0	1	2	6	14	8	4	5	41
	2011	0	0	0	2	1	11	7	9	4	4	38
	2012	0	0	0	0	6	5	10	5	8	4	38
	2013	1	0	1	0	3	9	11	4	5	2	36

The distribution of BMI (body mass index) of donors in Australia and New Zealand for the period 2009 - 2013 are shown in Figures 4.29 and 4.30.

Figure 4.29

BMI of Donors, Australia
2009-2013

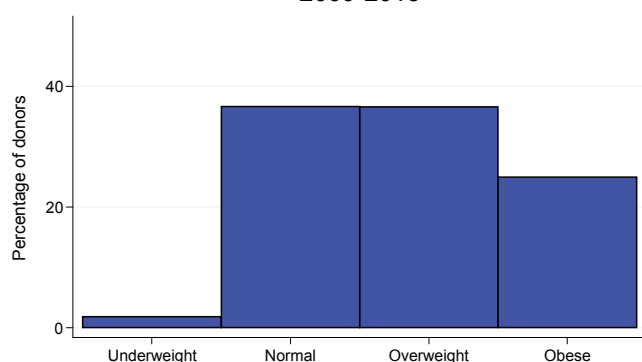
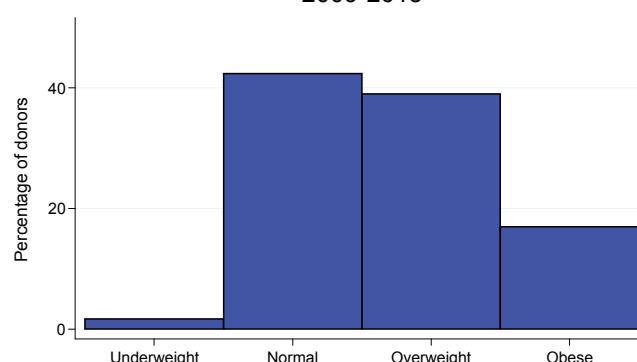


Figure 4.30

BMI of Donors, New Zealand
2009-2013





Donor Profile

Medical Condition of Donors

Figure 4.31

Medical Condition of Donors by States/Country 2013 (2012)											
Donor Type	Medical Condition	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
DBD	Diabetes Type I	0 (2)	1 (0)	0 (0)	1 (1)	0 (1)	2 (1)	0 (0)	0 (0)	4 (5)	0 (1)
	Diabetes Type II	2 (3)	6 (12)	1 (3)	7 (2)	0 (2)	2 (1)	0 (0)	2 (1)	20 (24)	3 (1)
	Hypertension	5 (13)	26 (25)	1 (5)	22 (18)	2 (3)	10 (5)	0 (1)	7 (6)	73 (76)	5 (11)
	Smoking-Current	27 (34)	31 (25)	2 (2)	30 (21)	3 (3)	13 (6)	2 (2)	21 (12)	129 (105)	6 (17)
	Cancer	3 (3)	4 (2)	1 (0)	1 (2)	0 (0)	0 (1)	0 (0)	4 (2)	13 (10)	1 (0)
DCD	Diabetes Type I	0 (0)	0 (1)	0 (0)	2 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (1)	0 (0)
	Diabetes Type II	0 (0)	0 (1)	0 (0)	3 (4)	0 (0)	0 (0)	0 (0)	0 (0)	3 (5)	0 (0)
	Hypertension	5 (5)	1 (3)	0 (0)	13 (7)	0 (0)	1 (2)	0 (0)	3 (0)	23 (17)	0 (0)
	Smoking-Current	9 (8)	7 (4)	0 (0)	12 (13)	1 (0)	0 (1)	1 (0)	1 (1)	31 (27)	1 (0)
	Cancer	1 (0)	1 (1)	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	3 (1)	0 (0)

Diabetes

There were 29 donors with diabetes in Australia in 2013. Six donors with Type 1 and 23 with Type 2 diabetes; there were three Type 2 diabetic donors in New Zealand.

In Australia, there were three diabetic Type 2 donors who did not have organs retrieved (two due to disease in organ and the other due to no suitable recipient). The 23 Type 2 donors (including three DCD donors) provided 26 kidneys, nine livers, 6 double lungs, 22 corneas, one set of heart valves, two bone donations and three tissue donations. The six diabetic Type 1 donors in Australia (including two DCD donors) provided eight kidneys, four livers, two hearts, four double lungs, eight corneas and one set of heart valves.

In New Zealand, four kidneys, two livers, one heart, one double lungs, four corneas and one tissue donation arose from the three diabetic Type 2 donors, from the thirteen donations of organ and tissue.

Hypertension

A past history of hypertension was recorded in 25% of donors (96) in Australia and 14% (5 donors) in New Zealand in 2013 (Figure 4.31). Included in the 96 donors for Australia were 23 DCD donors with a past history of hypertension.

These donors provided Australia with 140 kidneys, 41 livers, four split livers, five hearts, one heart/lung, 34 double lungs, 107 corneas, 15 sets of heart valves, 14 bone donations and 12 tissue donations. Three of the 96 donors did not provide any organs; one due to disease in organ and two due to no suitable recipient.

In New Zealand, 5 donors provided 10 kidneys, three livers, three hearts, three double lungs and two corneas.

Donor Profile



Smoking

In 2013, 41% (160) of Australian donors were recorded as current smokers while in New Zealand, 19% (7 donors) were reported as current smokers.

Cancer in Donor

Australia (16 donors)

In Australia, 16 donors had a history of cancer prior to donation.

- * Eight previously diagnosed with squamous cell carcinomas (6 cervical , one on the skin of the hand)
- * Two adenocarcinoma - one pituitary, one prostate
- * One astrocytoma of the left cerebral hemisphere
- * One with previously diagnosed leukaemia
- * Four reported as having cancer of unknown type or site

There were 30 kidneys, 11 livers and two split livers, three hearts, eight double lungs, one pancreas, 15 corneas and one bone donation from these 16 donors. Three were DCD donors.

New Zealand

In New Zealand, one donor (DBD) in 2013 had a history of previous cancer of thyroid origin. Three organs were donated and transplanted from this donor.



Donor Profile

Virology Screening

Figure 4.32

Cytomegalovirus (CMV) Status of Donors 2008 - 2013												
	Australia						New Zealand					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Positive	167	144	191	214	225	242	15	19	23	21	30	21
Negative	92	103	118	123	129	148	16	24	18	17	8	15
Total	259	247	309	337	354	390	31	43	41	38	38	36

In 2013, there was only one donor in Australia whose CMV result was equivoquel.

Figure 4.33

Epstein-Barr Virus (EBV) Status of Donors 2008 - 2013												
	Australia						New Zealand					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Positive	179	157	198	293	321	356	28	37	33	27	33	27
Negative	18	14	14	28	33	33	3	3	2	4	1	4
Not done	62	76	97	16	0	2	0	3	6	7	4	0
Total	259	247	309	337	354	391	31	43	41	38	38	31

Not all Australian States require organ donors to be tested for EBV

Hepatitis C Antibody

There were fourteen Hepatitis C positive donors, thirteen in Australia and one in New Zealand in 2013.

Of those positive donors in Australia, twelve were DBD donors. There were four kidneys, four livers, one heart and two double lungs donated.

The positive donor in New Zealand was a DBD donor, who donated a liver.

There was only one donor who was positive for both HCV and HBV core antibodies, and this donor provided a liver transplanted as a whole.

Figure 4.34

Hepatitis C Antibody Status of Donors 2008 - 2013												
	Australia						New Zealand					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Positive	5	5	2	7	5	13	1	0	0	1	2	1
Negative	254	242	307	330	349	378	30	43	41	37	36	35
Total	259	247	309	337	354	391	31	43	41	38	38	36

Donor Profile

Hepatitis B Core Antibody

The Registry commenced collection of Hepatitis B core antibody results in 1998.

A positive result was recorded for 4% (17) of Australian donors and 6% (2) of New Zealand donors in 2013.

Of those positive donors in Australia, all were DBD. These 17 donors, provided 22 kidneys, nine whole

livers, one split liver, one heart, four double lungs, eight corneas, three cardiovascular tissue, one musculoskeletal and skin tissue.

Of the two positive Hepatitis B donors in New Zealand, there were no kidneys, two whole livers, two corneas, and one skin tissue donation.

Figure 4.35

Hepatitis B Core Antibody Status of Donors 2008 - 2013												
	Australia						New Zealand					
	2008	2009	2010	2011	2012	2013	2008	2009	2010	2011	2012	2013
Positive	16	13	20	11	15	17	2	5	2	5	8	2
Negative	243	234	289	326	339	374	29	38	39	33	30	34
Total	259	247	309	337	354	391	31	43	41	38	38	36

Hepatitis B Surface Antigen

Since 1993, all donors in Australia and New Zealand have been negative for Hepatitis B surface antigen, except one donor in 2004 who was not tested.



Chapter 5

Organ Data



in Australia and New Zealand



Kidney Donation

In Australia, there were 630 kidney transplant recipients in 2013, an increase of 29.7% since 2009. Of the 630 kidney transplant procedures performed, there were nine double adult, six enbloc, thirty three combined kidney/pancreas, one kidney/heart transplant and five kidney/liver recipients.

In New Zealand, there were 55 kidney recipients including two double adult and one enbloc kidney and two combined kidney/pancreas transplant procedures.

Figures 5.1 to 5.5 show the outcome of requests for kidney donation, the number of kidney transplants by donation pathway and the number of kidney recipients by jurisdiction, in Australia and New Zealand respectively. In particular figure 5.3 shows an increase in DCD kidneys from 2006 to 2011, and DBD kidneys from 2010 to 2013 in Australia.

Figure 5.1

Outcome of Request for Kidney Donation Australia 2013

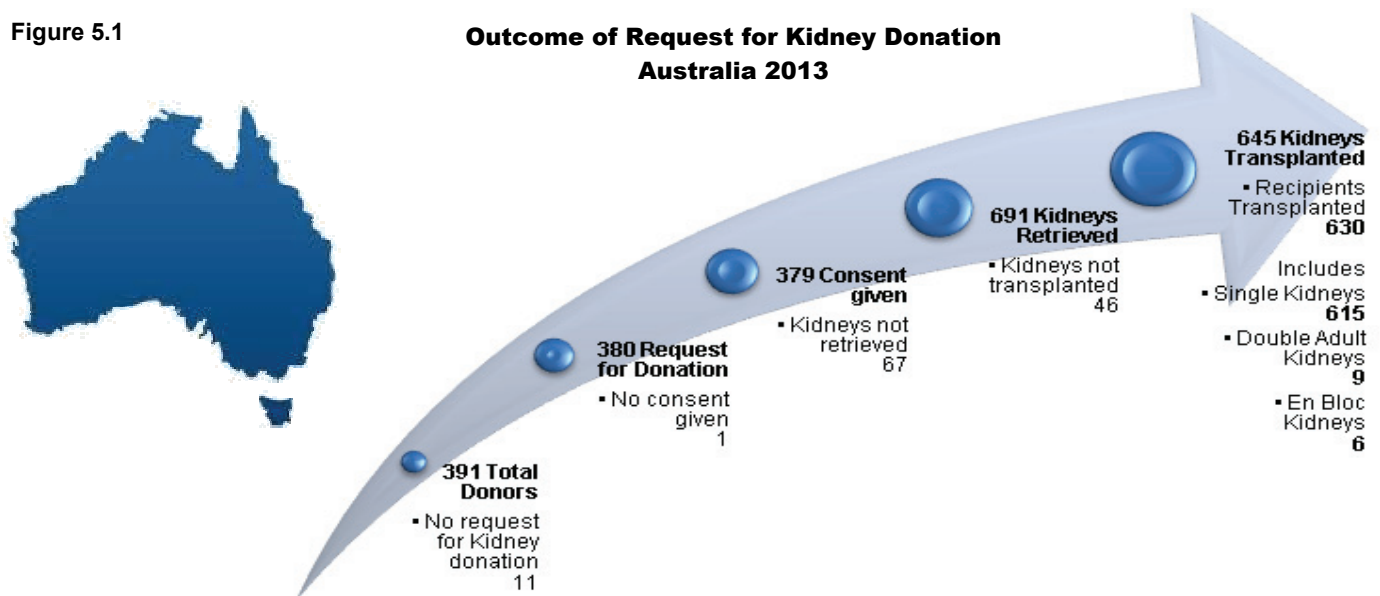


Figure 5.2

Outcome of Request for Kidney Donation New Zealand 2013



Organ Data



Figure 5.3

**Kidneys Transplanted by Type of Organ Donor
Australia 1998-2013**

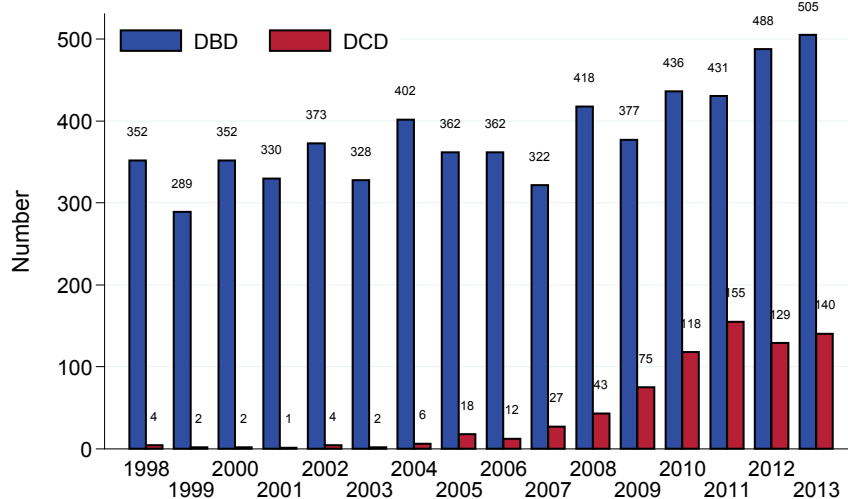


Figure 5.4

**Kidneys Transplanted by Type of Organ Donor
New Zealand 1998-2013**

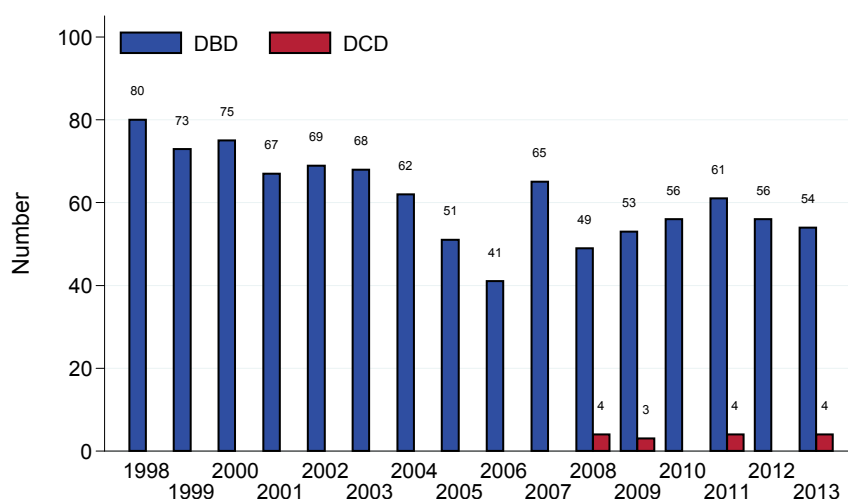
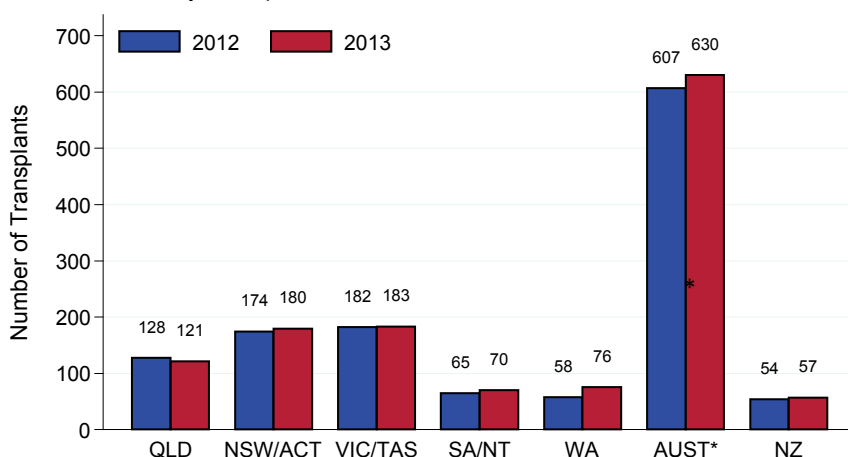


Figure 5.5

**Deceased Donor Kidney Transplant Recipients*
by Transplant State Australia and New Zealand 2012-2013**



*These numbers include the exchange of organ between States and Territories of Australia and New Zealand



Organ Data

In 2013, there were 67 kidneys not retrieved from Australian donors and 7 from New Zealand donors. For Australia, the main reason was due to the kidney not being medically suitable (48), followed by no suitable recipient for the kidney (14). In New Zealand all non-retrieved kidneys were due to not being medically suitable.

Figures 5.6 and 5.7 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). In Australia the non-utilisation rate remained steady at around 3% over 2004-2012, but increased to 6.7% (95% CI 4.9 to 8.8) in 2013. In New Zealand these rates have historically been generally higher than in Australia and rose to 4.9% in 2013 from its lowest rate 1.5% in 2011 (note the different y-axis scales). By way of comparison, reported international non-utilisation rates were 23.5% in Spain¹ for 2013 and 19% in 2012 in the United States of America². The reasons why kidneys were not utilised for organ transplant is presented in Figure 5.9. (For the purpose of reliable reporting, re-categorisation of reasons have meant that previously reported values differ in some categories in past years reports.)

Figure 5.6

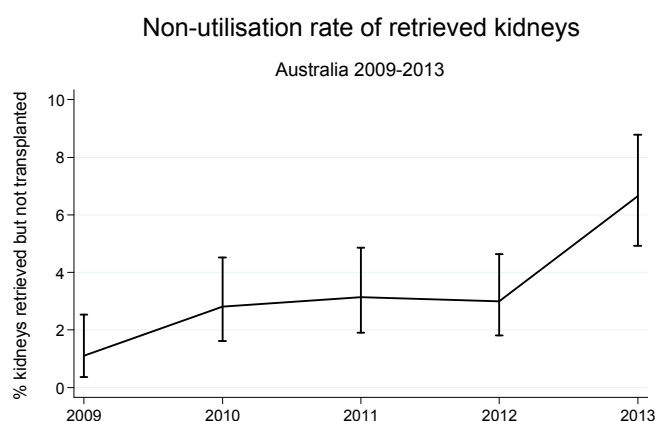


Figure 5.7

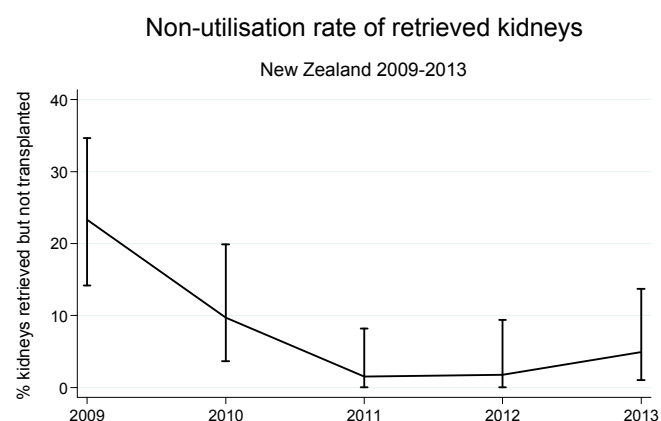


Figure 5.9

Reasons Kidneys Retrieved and Not Utilised for Organ Transplantation in Australia (New Zealand) 2009 - 2013						
Year	Logistics	Medically Unsuitable	Surgically Unsuitable	No Suitable Recipient	Other	Total
2009	1	1(16)	1(1)	0	3	5 (17)
2010	0	8 (6)	2	1	5	16 (6)
2011	1	9	3	4 (1)	2	19 (1)
2012	0	8 (1)	7	2	2	19 (1)
2013	3	31(3)	7	2	3	46 (3)

Footnotes: 1 Memorias de actividad - ONT 2013

2 OPTN/SRTR 2012 Annual Data Report

Organ Data

Age of Kidney Donors

The age distribution of donors providing transplanted kidneys for Australia and New Zealand is shown in Figures 5.10 and 5.11 respectively.

Figure 5.10

Age of Donors Providing Transplanted Kidneys
Australia 2013

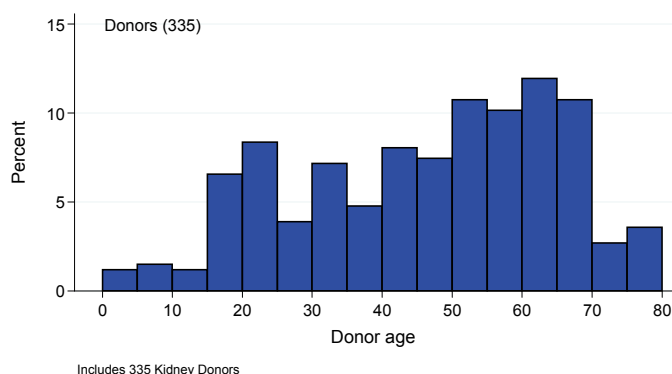
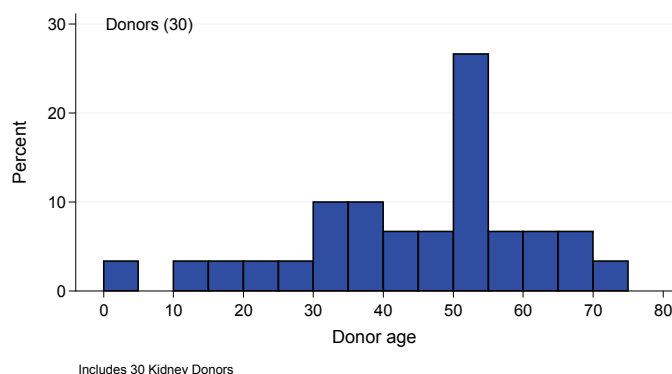


Figure 5.11

Age of Donors Providing Transplanted Kidneys
New Zealand 2013



Donor Kidney Function

Australia

In 2013, in Australia, 49 donors (14%) had a terminal serum creatinine concentration of $\geq 125 \mu\text{mol/L}$ and 33 donors (9%) had a terminal serum urea concentration of $\geq 9 \text{ mmol/L}$, shown in Figure 5.12.

New Zealand

There were four donors (12%) in New Zealand with a terminal serum creatinine concentration of $\geq 125 \mu\text{mol/L}$ and no donors with a terminal serum urea concentration of $\geq 9 \text{ mmol/L}$ in 2013.

Figure 5.12

Terminal Serum Creatinine Levels 2009 - 2013										
Creatinine ($\mu\text{mol/L}$)	Australia					New Zealand				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
00-99	77%	78%	76%	75%	79%	87%	90%	81%	87%	81%
100-124	9%	6%	11%	9%	7%	5%	3%	9%	10%	6%
125-149	5%	4%	5%	5%	4%	5%	3%	6%	3%	6%
150-174	2%	4%	3%	2%	3%	3%	3%	-	-	3%
175-199	1%	2%	1%	2%	2%	-	-	-	-	-
200-224	1%	1%	1%	1%	1%	-	-	3%	-	-
225-249	1%	1%	1%	1%	0%	-	-	-	-	3%
≥ 250	4%	3%	2%	4%	4%	-	-	-	-	-

Donor Kidney Biopsy

In 41 donors (11.7%) a biopsy of the kidneys was taken at the time of retrieval in 2013 in Australia and ten donors (42%) in New Zealand. Since 2000, there have been 399 (12.2%) biopsies from 3,247 kidney donors in Australia and 160 (34.8%) from 460 kidney donors in New Zealand.

Liver Donation

In 2013, there were 243 livers retrieved providing 252 recipients with transplanted livers from Australian donors and 25 retrievals in New Zealand providing for 26 recipients, as shown in Figure 5.13 and 5.14. This was an increase of 26.5% for liver transplant procedures since 2009. There were five combined liver/kidney transplants and one liver/lung transplant in Australia.

Thirty eight partial liver transplants, from 19 donors, were performed in Australia using the “split” liver technique (transplanting one liver into two recipients) and there were seven reduced size livers transplanted into paediatric recipients.

Figure 5.13

Outcome of Request for Liver Donation Australia 2013

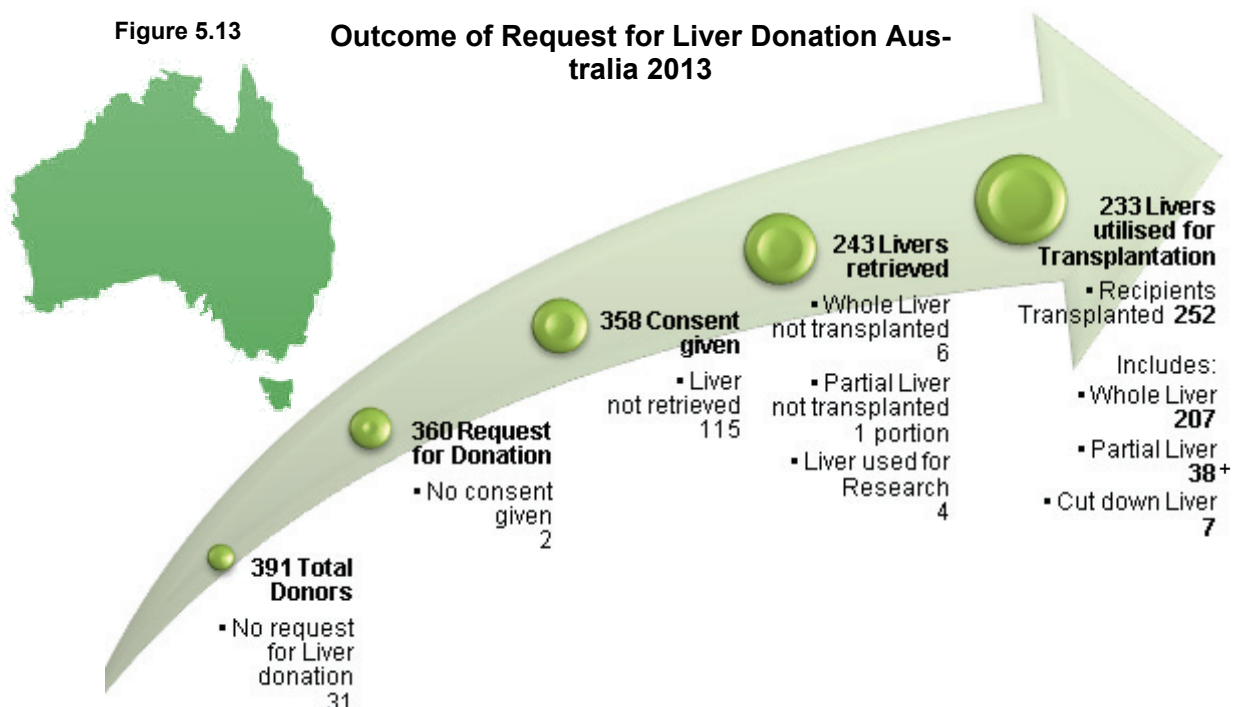
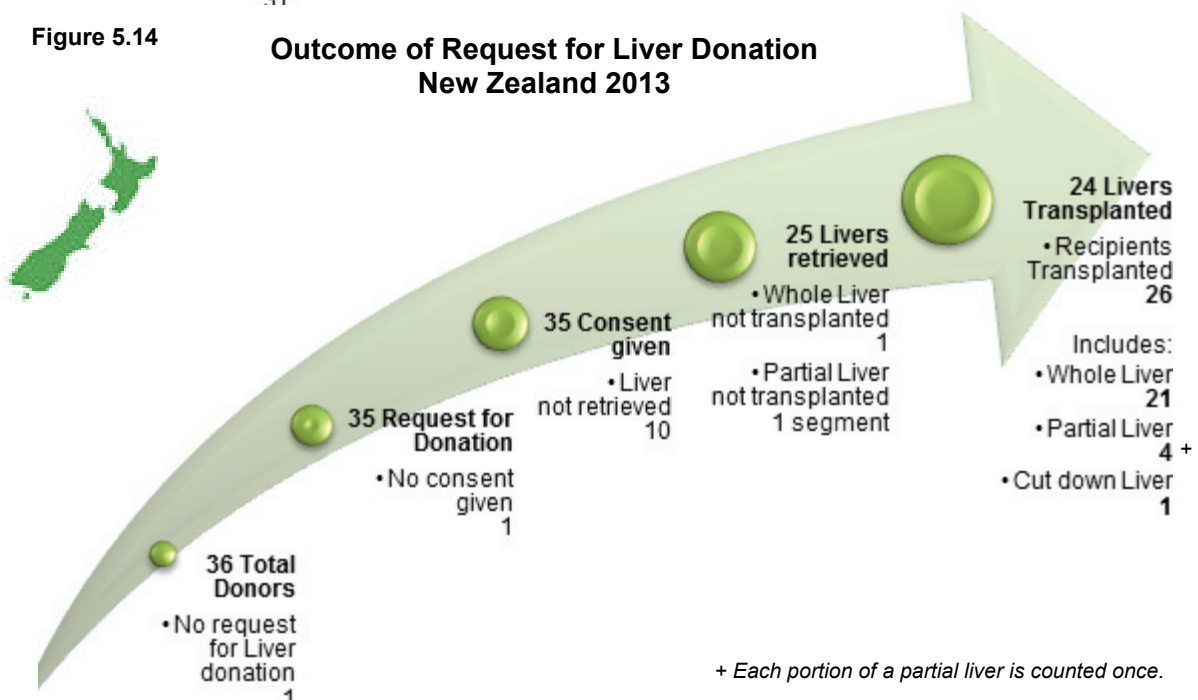


Figure 5.14

Outcome of Request for Liver Donation New Zealand 2013



+ Each portion of a partial liver is counted once.

Organ Data



Figures 5.15 and 5.16 show the number of recipients of liver transplants by type of organ donor pathway in Australia and New Zealand respectively from 1998 to 2013.

Figure 5.15

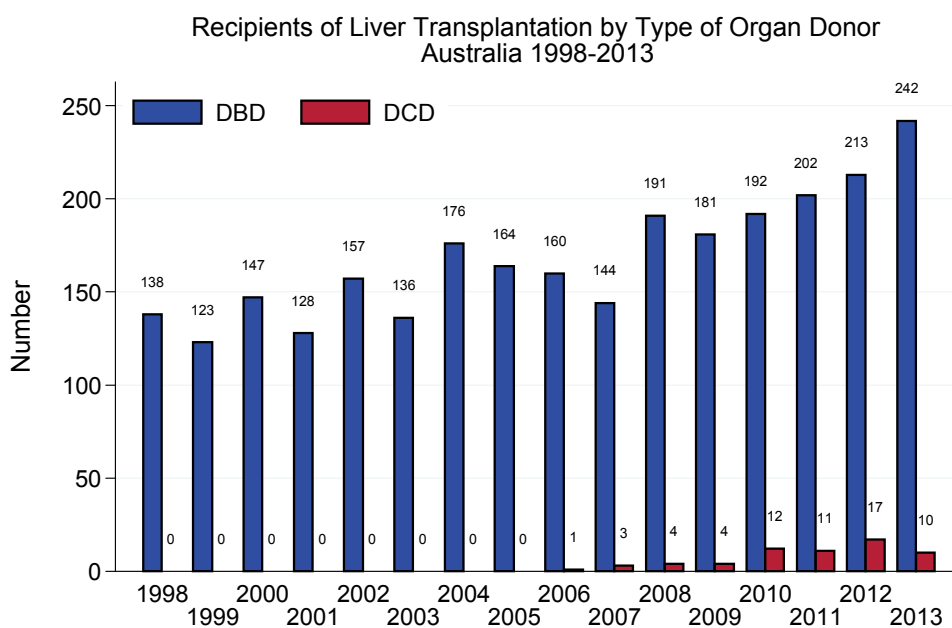


Figure 5.16

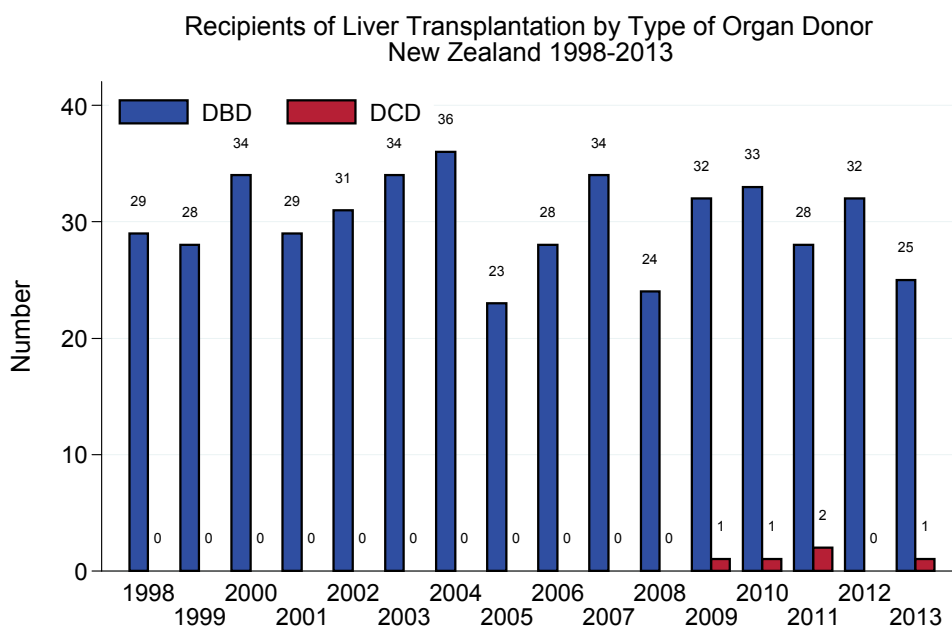
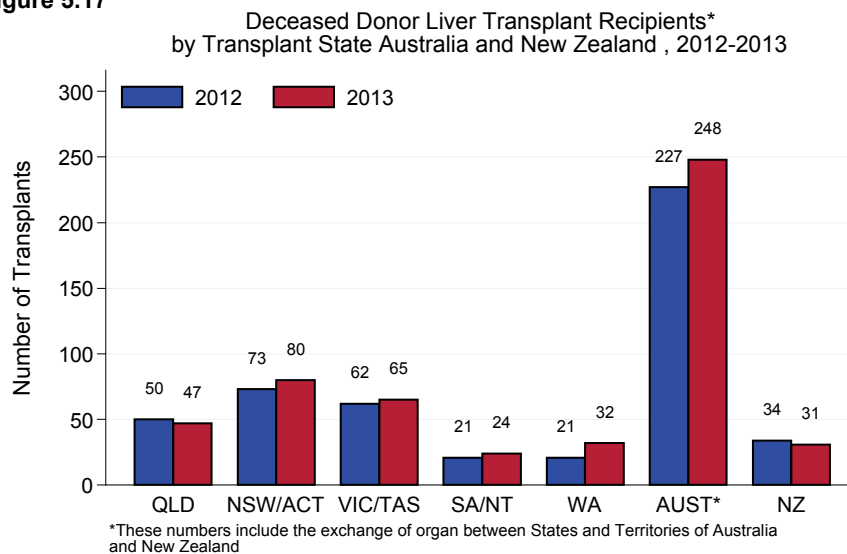


Figure 5.17 compares the number of deceased donor liver recipients, by state and country, for 2012 and 2013.

Figure 5.17



There were 115 livers not retrieved from Australian donors in 2013 and 10 from New Zealand donors.

For Australia, the main reasons were the liver not being medically suitable (73), followed by age of donor (17) and DCD (11). In New Zealand mostly non-retrieved livers were due to being not medically suitable (9).

Figure 5.20 tabulates the reasons livers were not used after retrieval for the purpose of transplantation since 2009.

Figure 5.20

Reasons Liver Retrieved and Not Utilised for Organ Transplantation in Australia (New Zealand) 2009 - 2013							
Year		Logistics	Medically unsuitable	Surgically unsuitable	No Suitable Recipient	Other	Total
Whole Liver	2009	1	2	0	0	0	3
	2010	0	2	0	0	1	3
	2011	0	1	0	0	0	1
	2012	0	5 (1)	0	0	1	6 (1)
	2013	0	6 (1)	0	0	4	10 (1)

Age of Liver Donors

The age of donors providing transplanted livers for Australia and New Zealand are shown in Figures 5.21 and 5.22 respectively.

Figure 5.21

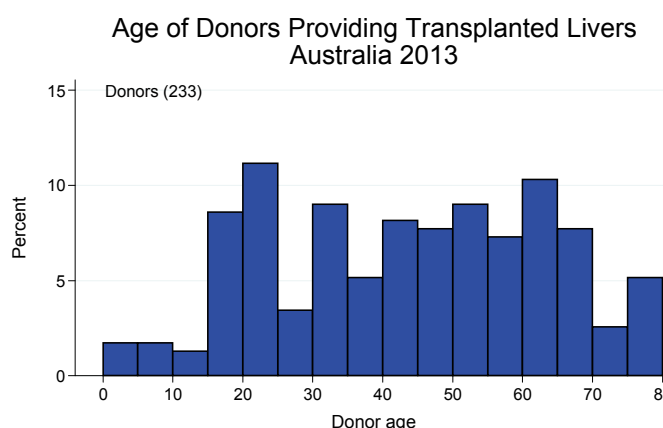
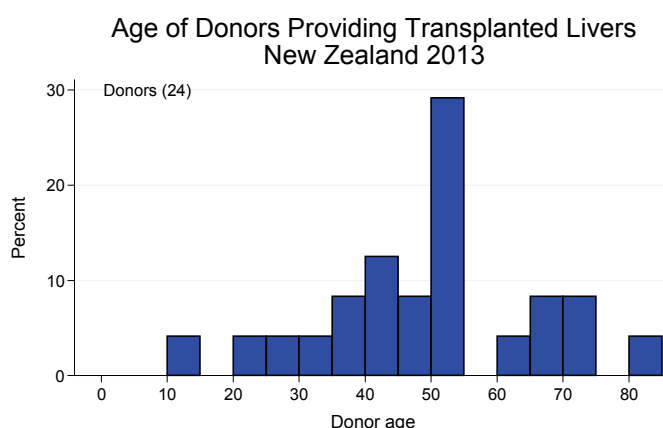


Figure 5.22



Donor Liver Function

The results of the serum tests for liver function for 243 Australian and 22 New Zealand donors in 2013 who had livers retrieved, are shown below. There were 80% of donors in Australia (195) and 86% of donors in New Zealand (19) who had all five tests performed. Figure 5.23 shows the number of donors whose liver function was above the normal range.

Figure 5.23

Number of Donors with Liver Function Tests above Normal Range 2013				
Liver Function Tests	Australia		New Zealand	
	Donors with value recorded *	Above Normal	Donors with value recorded *	Above Normal
Alanine Transaminase ALT > 40 u/L	243	97	22	9
Aspartate Transaminase AST > 40 u/L	195	105	19	8
Gamma Glutamyl Transferase GGT > 60 u/L	241	60	19	7
Alkaline Phosphatase > 116 u/L	242	33	25	0
Total Bilirubin > 20 umol/L	242	32	25	2
* Not all donors have all tests				



Heart Donation

In 2013, there were 77 heart transplant recipients and two heart/double lung transplant recipients. This was an increase of almost 30% for heart transplants since 2009.

New Zealand performed nine heart transplants in 2013. This number has been relatively stable since 2011.

Figures 5.25 and 5.26 show the outcome of request for heart donation in Australia and New Zealand for 2013 respectively.

Figure 5.25

Outcome of Request for Heart Donation Australia 2013

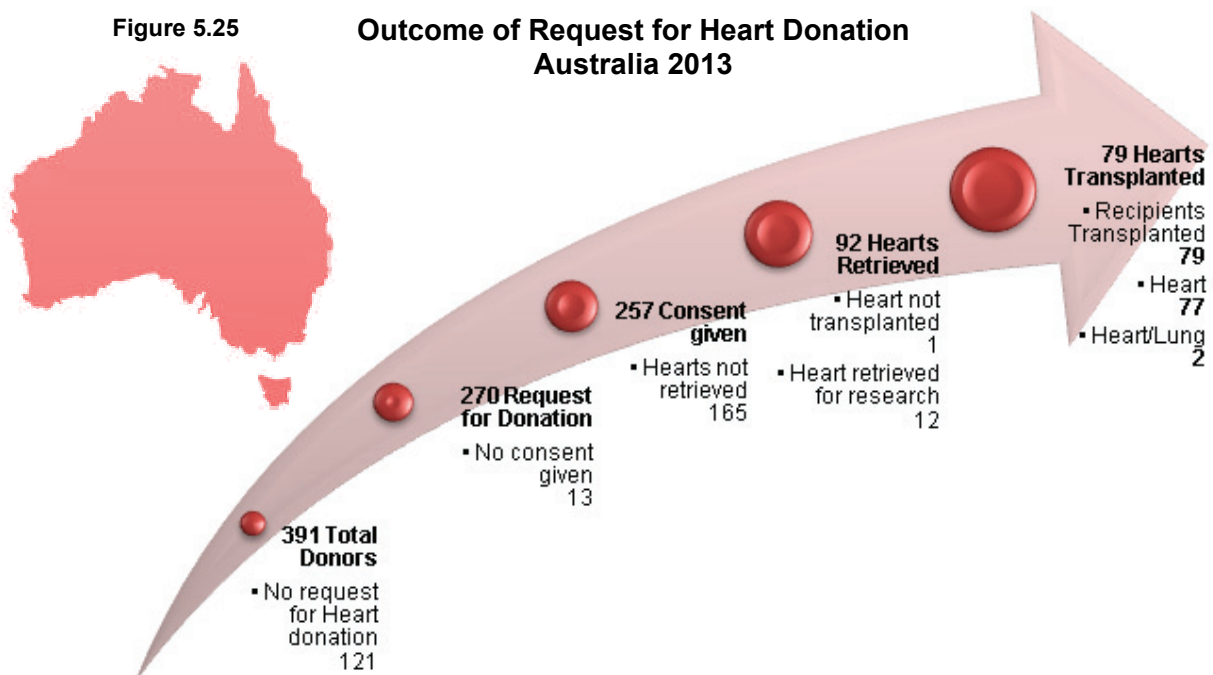
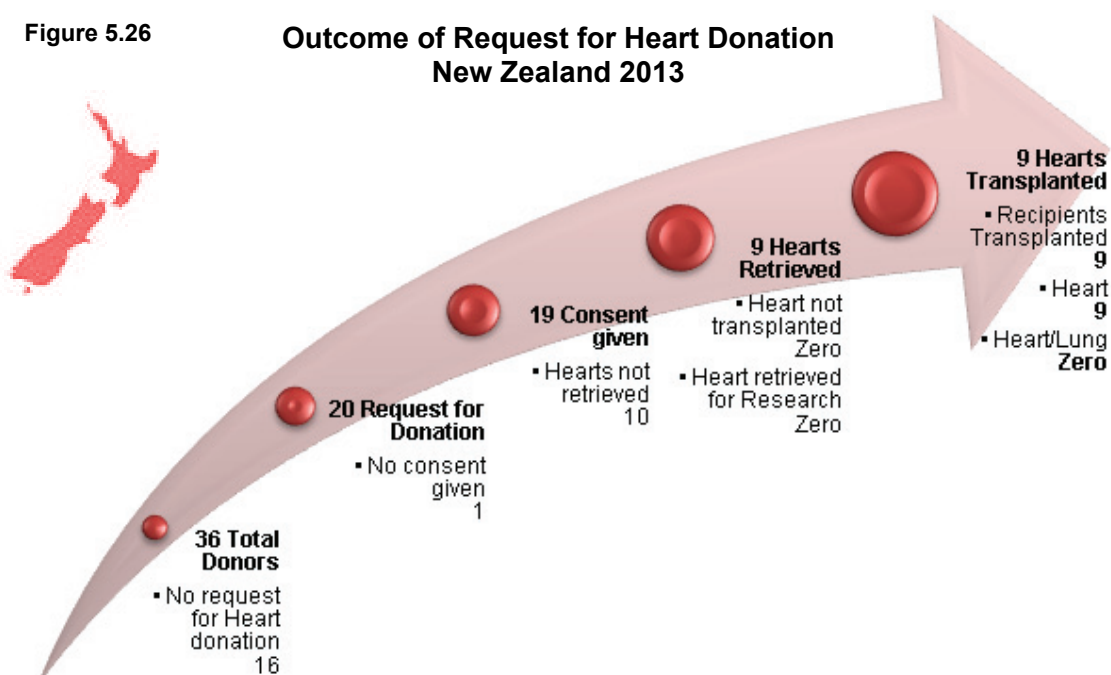


Figure 5.26

Outcome of Request for Heart Donation New Zealand 2013



Organ Data



Figures 5.27 and 5.28 show the number of recipients of heart transplants in Australia and New Zealand respectively from 1998 to 2013.

Figure 5.27

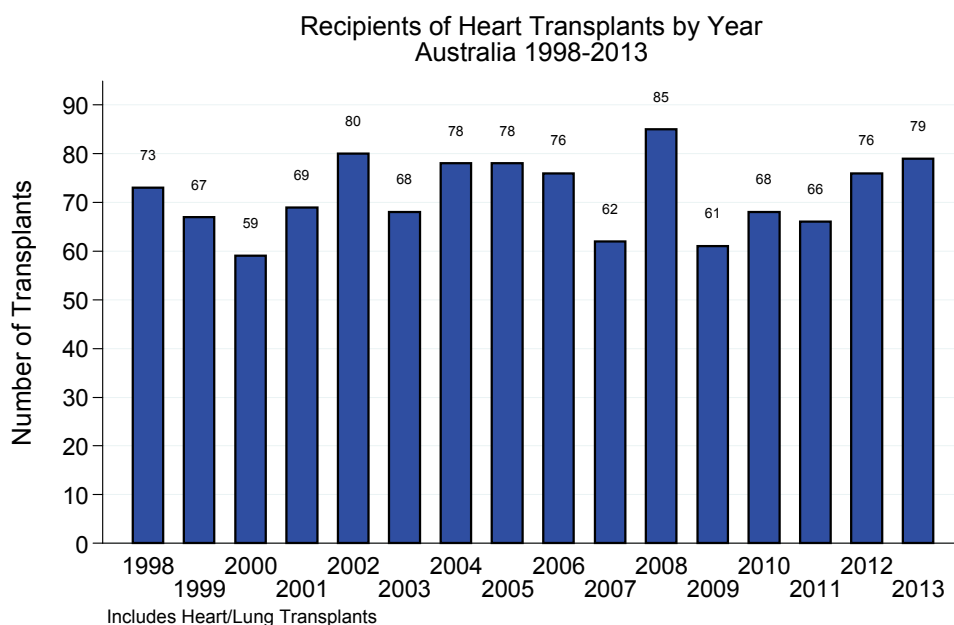
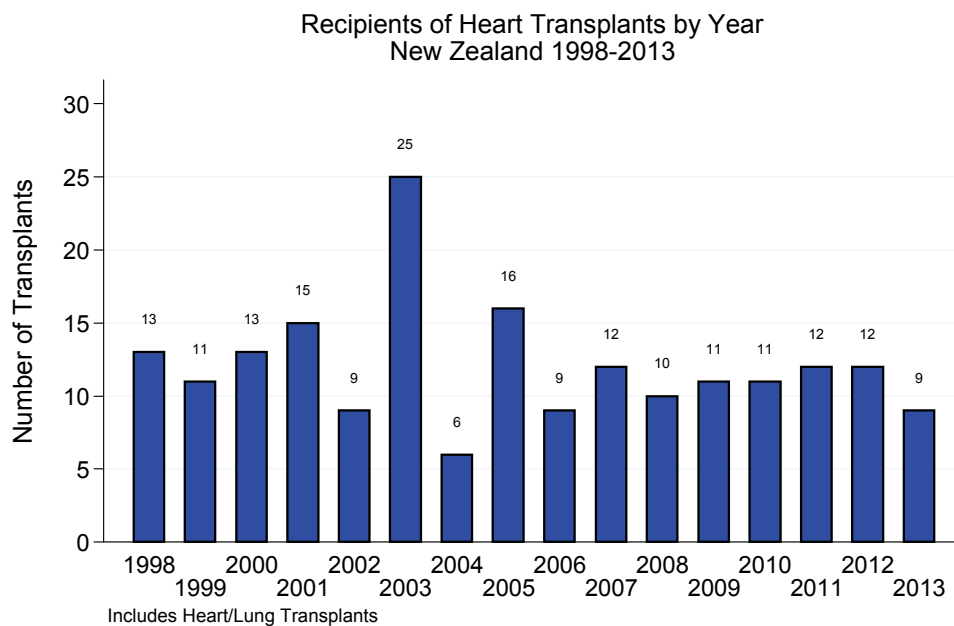


Figure 5.28





Organ Data

Figure 5.29

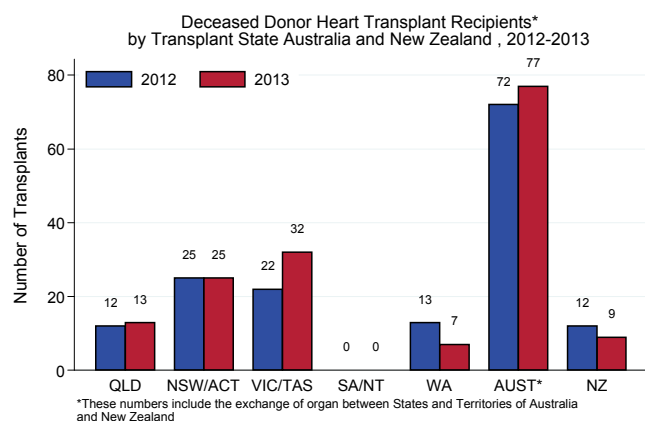
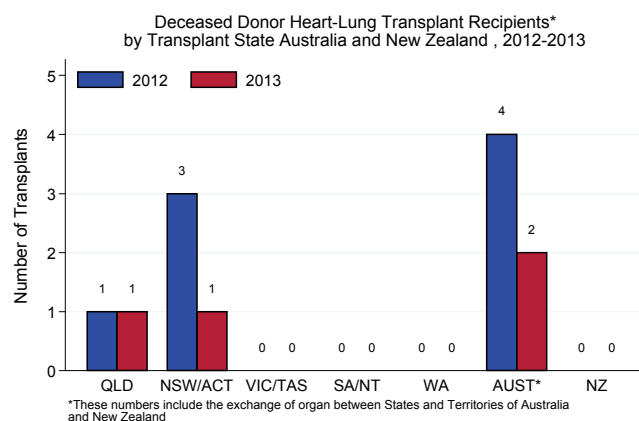


Figure 5.30



In 2013, there were 165 hearts not retrieved from Australian donors and 10 from New Zealand donors. For Australia, the main reason was due to the heart not being medically suitable (76), followed by no suitable recipient for the heart (35) and age of donor (28).

In New Zealand, eight hearts were not retrieved as they were medically unsuitable and two due to no suitable.

Age of Heart Donors

The age of donors providing transplanted hearts for Australia and New Zealand are shown in Figures 5.33 and 5.34 respectively.

Figure 5.33

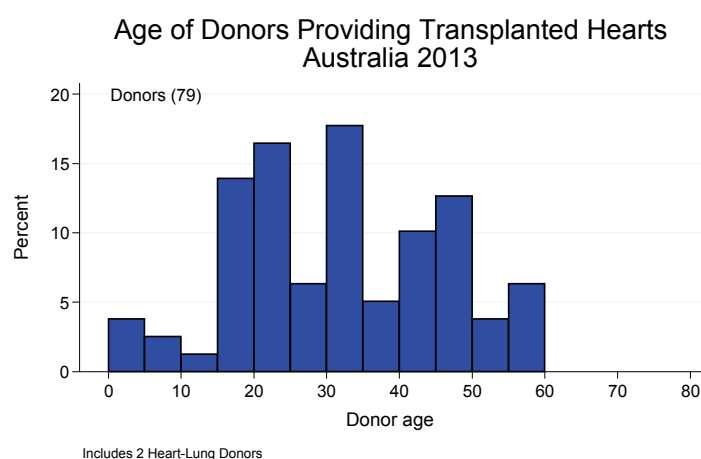
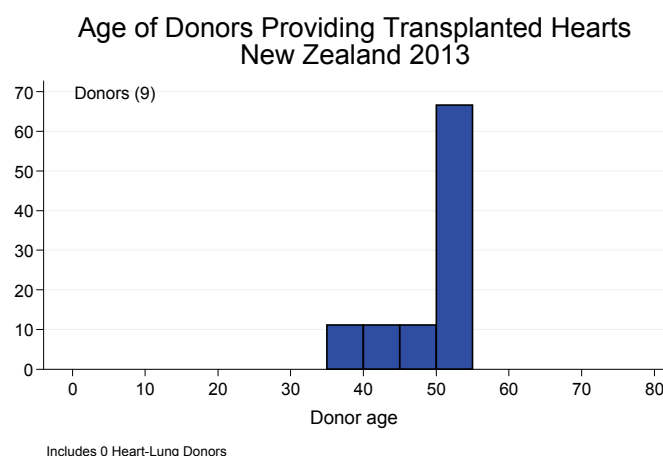


Figure 5.34



ECG and Echocardiogram

In Australia, 69 donors (74%) had a normal ECG and 76 of the 92 heart donors (82%), had a normal echocardiogram. In New Zealand, eight of the nine heart donors had a normal ECG and all nine had normal echocardiogram.

Organ Data

Lung Donation

In 2013, in Australia, there were 169 lung transplant recipients, 162 double lung, five single lung recipients and two heart/double lung recipients. This represents a 48% increase in lung transplants since 2009. In New Zealand 18 double lung transplants occurred in 2013.

Figure 5.35

Outcome of Request for Lung Donation Australia 2013

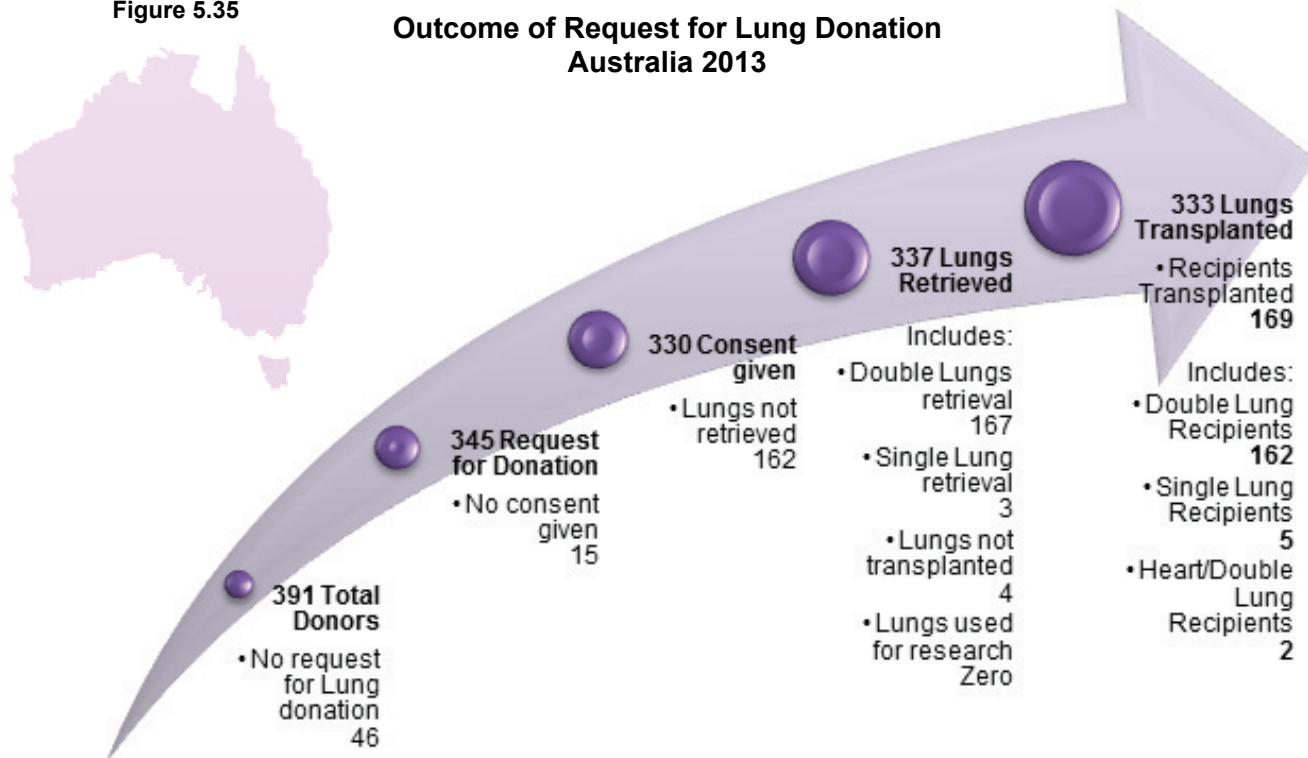
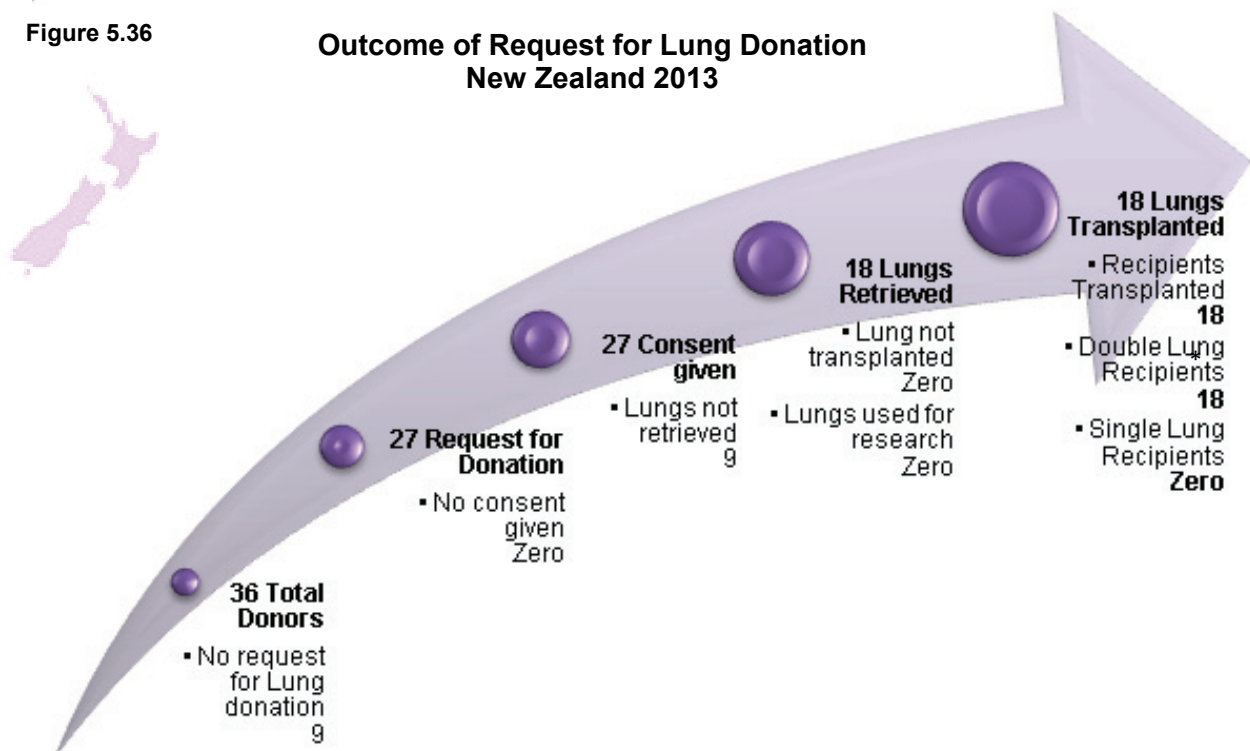


Figure 5.36

Outcome of Request for Lung Donation New Zealand 2013



Figures 5.37 and 5.38 show the number of recipients of lung transplants by type of organ donor pathway in Australia and New Zealand respectively from 1998 to 2013.

Figure 5.37

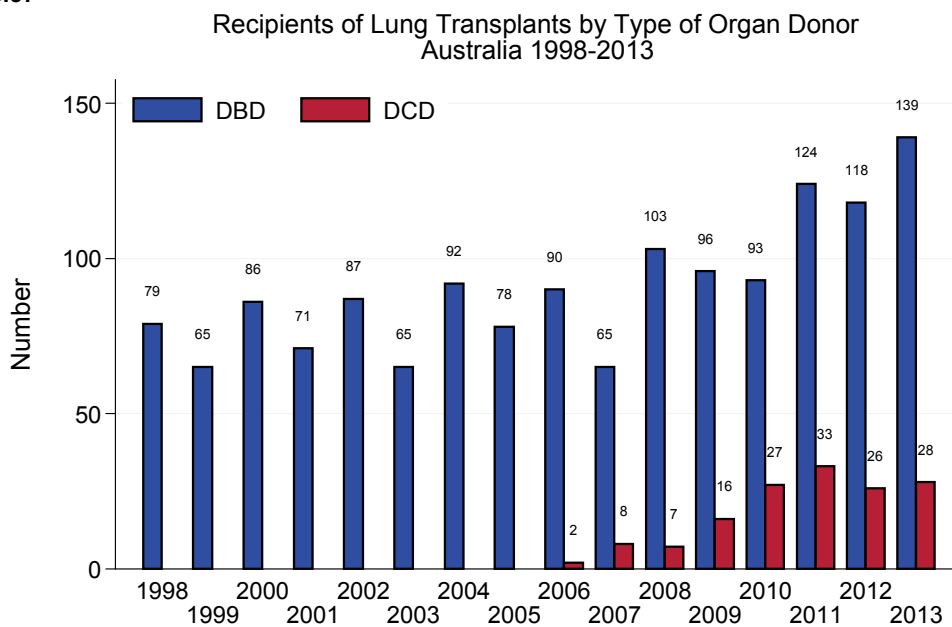


Figure 5.38

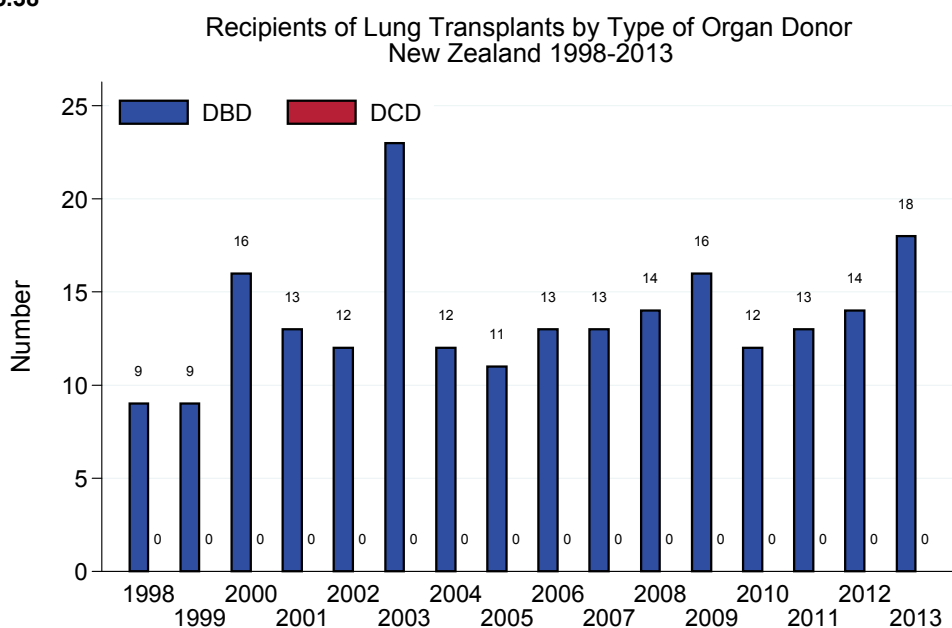
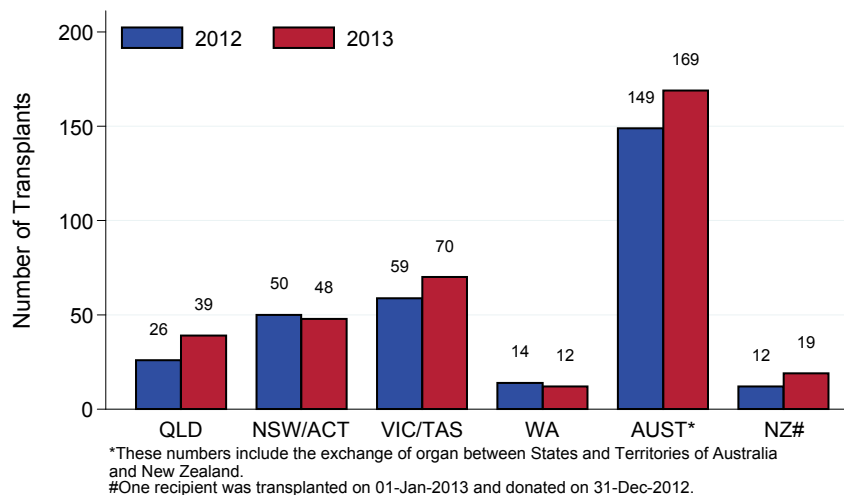


Figure 5.39 Deceased Donor Lung Transplant Recipients*
by Transplant State Australia and New Zealand , 2012-2013



In 2013, there were 162 lungs not retrieved from Australian donors and nine from New Zealand donors. For Australia, 106 lungs were not medically suitable, 28 had no suitable recipient, eight due to trauma to the organ and seven were not used due to age of donor. In New Zealand, seven were not medically suitable, one each of no suitable recipient and trauma to organ.

Figure 5.42 shows the reason lungs were not used from Australian deceased donors since 2005. In New Zealand only one lung in 2009 was not transplanted, due to no suitable recipient being available.

Figure 5.42

Reasons Lungs Retrieved and Not Utilised for Organ Transplantation in Australia (New Zealand) 2009 - 2013						
Year	Logistics	Medically Unsuitable	Surgically Unsuitable	No Suitable Recipient	Other	Total
2004	0	0	0	0	0	0
2005	0	1	0	1	0	2
2006	0	0	0	0	0	0
2007	0	2	2	0	0	4
2008	0	1	0	0	3	4
2009	0	0	0	0	0	0
2010	0	1	2	0	2	5
2011	0	1	0	0	1	2
2012	0	0	0	0	3	3
2013	0	4	0	0	0	4



Organ Data

Age of Lung Donors

The age distribution of donors providing transplanted lungs for Australia and New Zealand is shown in Figures 5.43 and 5.44 respectively.

Figure 5.43

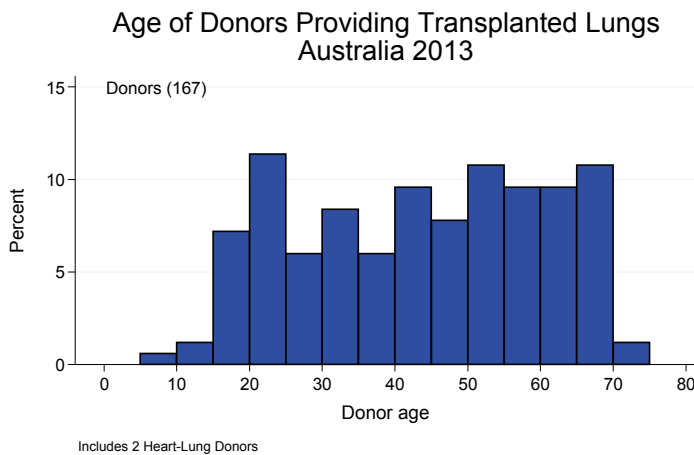
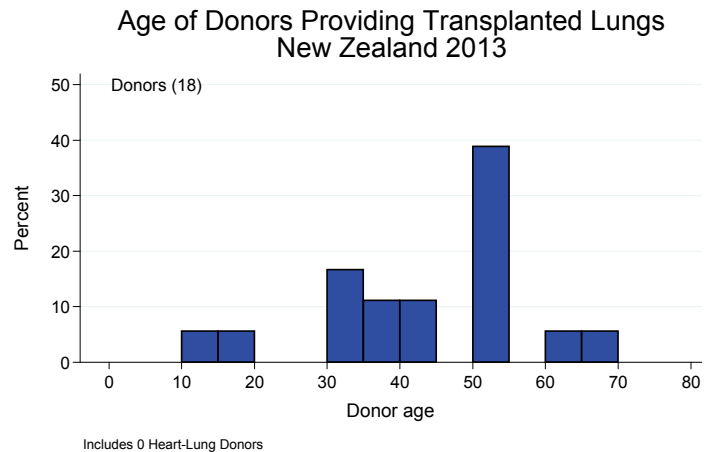


Figure 5.44



DONOR LUNG FUNCTION

Australia

There were 108 Australian lung donors (64%) who had a bronchoscopy in 2013. Sixteen donors had chest trauma; these included nine pneumothorax, four with a chest drain, two with fractured ribs and one with an effusion.

The arterial blood gases were taken on 100% FiO₂ and PEEP of 5 cm. Fifty six donors had a PEEP > 5 cm (33%).

The results from 169 lung donors in 2013 show 11% (18) to be acidotic (pH < 7.35) and 17% (28) to be alkalotic (pH > 7.45).

Oxygenation measured as PaO₂ ranged from 43-930 mmHg with a median of 40 mmHg.

PaCO₂ ranged from 4.70 - 54.0 mmHg with a median of 37.9 mmHg.

New Zealand

There were four (22%) New Zealand lung donors who had a bronchoscopy in 2013. No donors had chest trauma.

All 18 lung donors had 100% FiO₂; six had a PEEP greater than 5cm.

The arterial blood gas results from nine lung donors in 2013 show 39% (7) to be acidotic (pH < 7.35) and two donors (11%) to be alkalotic (pH > 7.45).

Oxygenation measured as PaO₂ ranged from 39 - 539 mmHg with a median of 379 mmHg.

PaCO₂ ranged from 30.0 - 329.00 mmHg with a median of 38.0 mmHg.

Pancreas Donation

There were 33 whole pancreas recipients in 2013, all as combined kidney/pancreas transplants (20 in New South Wales and 13 in Victoria). In addition, there was one pancreas islets transplant performed in New South Wales.

In New Zealand in 2013, there were no pancreas retrieved for transplantation.

Figure 5.45

Outcome of Request for Pancreas Donation Australia 2013

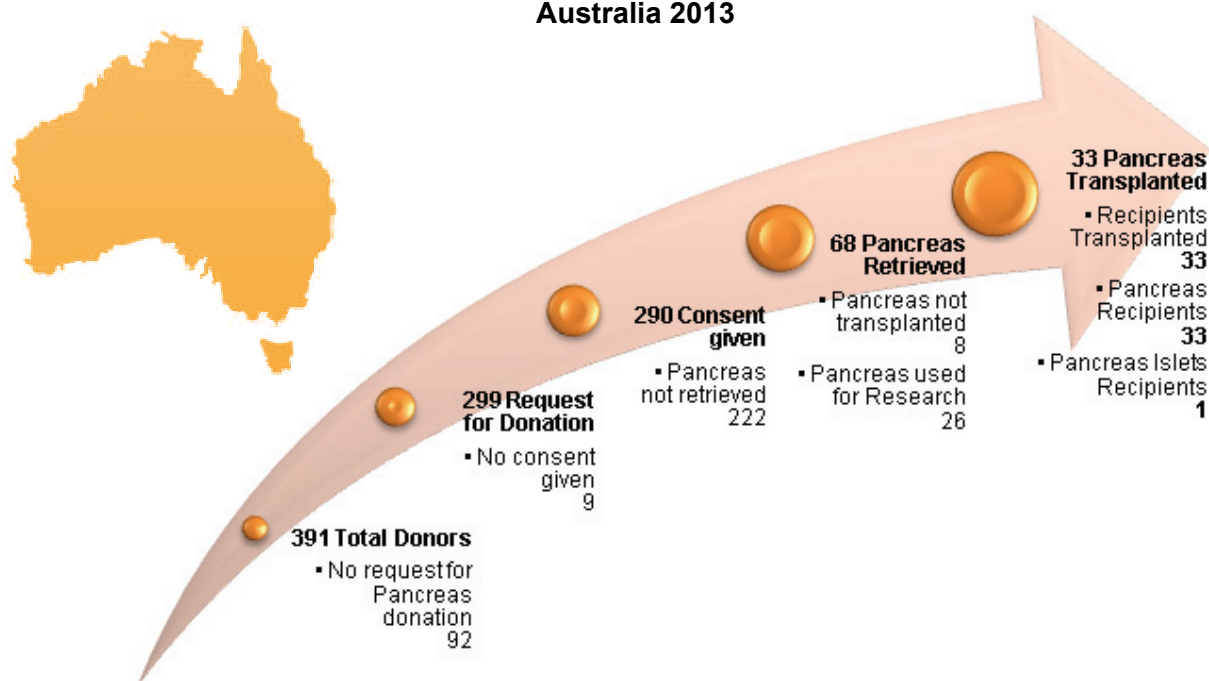
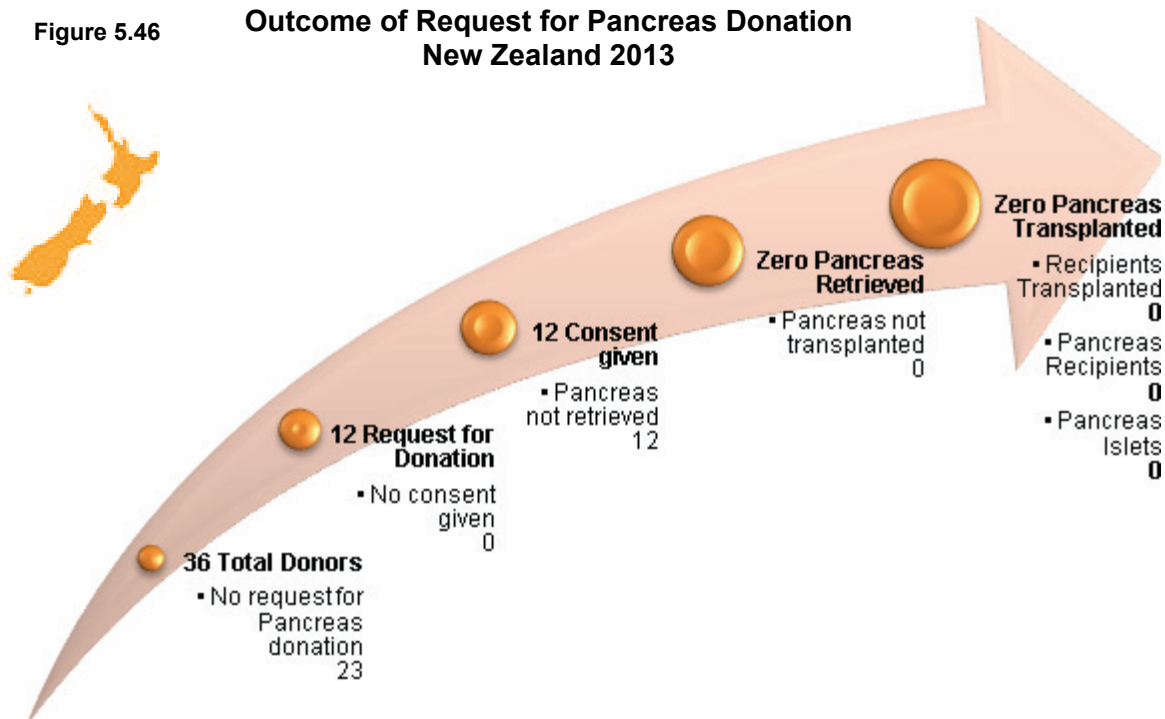


Figure 5.46

Outcome of Request for Pancreas Donation New Zealand 2013



Figures 5.47 and 5.48 show the number of recipients of Pancreas transplants by type of organ donor pathway in Australia and New Zealand respectively from 1998 to 2013.

Figure 5.47

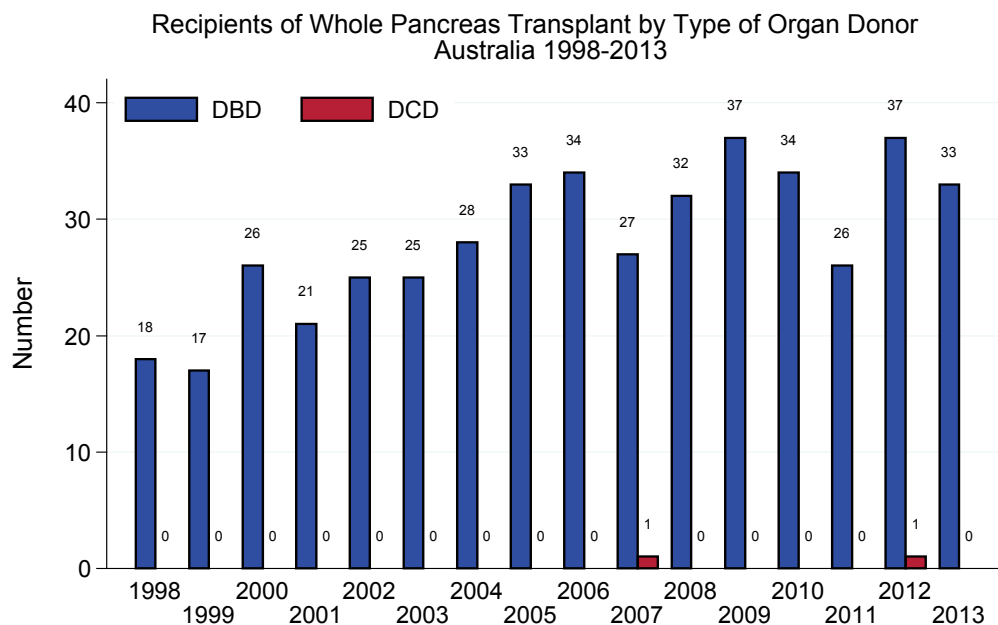
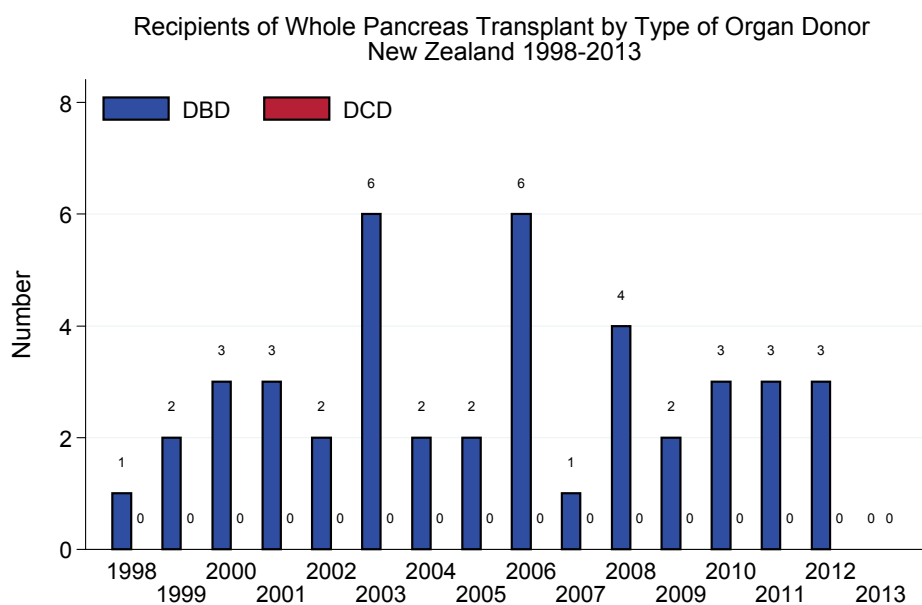


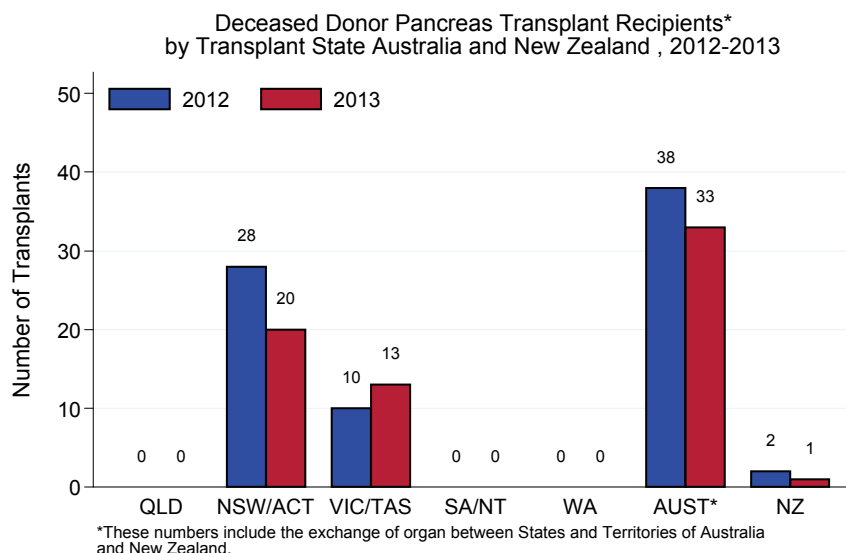
Figure 5.48



Organ Data



Figure 5.49



In 2013, there were 222 pancreas not retrieved from Australian donors and 12 from New Zealand donors. For those pancreas not retrieved in Australia, 70 were not medically suitable, 49 due to age of donor, 31 due to logistical issues, 25 due to no suitable recipient being available, 24 a result of DCD donation, four due to trauma to organ and two surgically unsuitable. In New Zealand, it was mostly due to no suitable recipient being available (6) and age of donor (4).

Sixty-eight donors in 2013 had pancreas retrieved, however 26 of those were not for the purpose of organ transplantation but rather retrieved for research purposes.

Figure 5.52 shows the reasons pancreas were not used from Australian deceased donors since 2005. In New Zealand only one pancreas in 2009 was not transplanted, due to no suitable recipient being available.

Figure 5.52

Reasons Pancreas Retrieved and Not Utilised for Organ Transplantation in Australia 2009 - 2013						
Year	Logistics	Medically Unsuitable	Surgically Unsuitable	No Suitable Recipient	Other	Total
2009	0	0	1	0	0	1
2010	0	2	0	0	0	2
2011	0	0	0	1	1	1
2012	2	1	0	1	0	2
2013	0	2	0	0	1	3

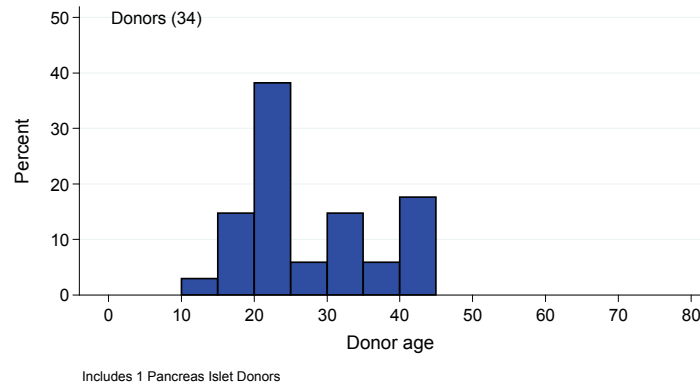


Age of Pancreas Donors

The age of donors providing transplanted pancreas for Australia are shown in Figures 5.53 .

Figure 5.53

Age of Donors Providing Transplanted Pancreas
Australia 2013



Pancreas Islets Donation

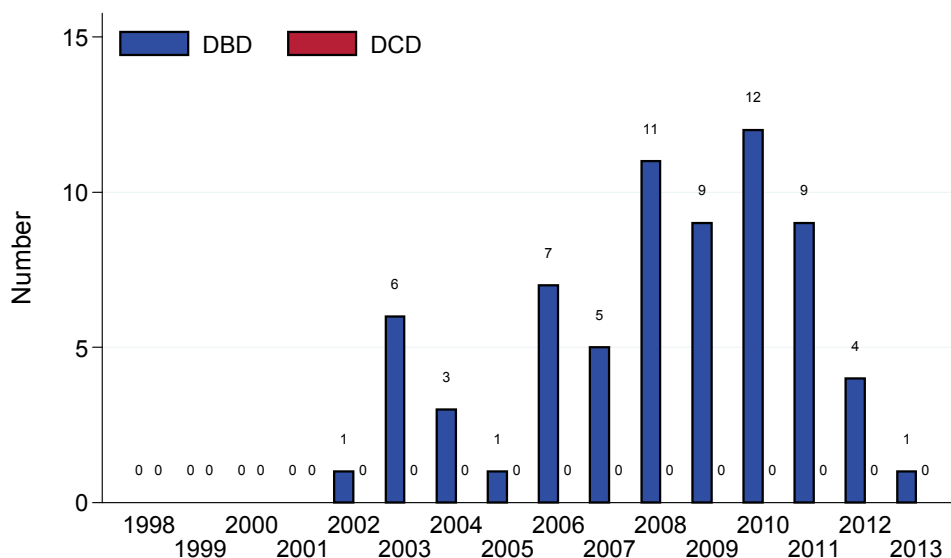
Pancreas islet transplantation is a procedure in which islets from the pancreas of the deceased organ donor are purified, processed and transplanted into a recipient. This procedure is performed only in people with Type 1 Diabetics where blood glucose levels are difficult to control.

In Australia and New Zealand, the total number of pancreas islet transplants performed, since this experimental procedure began in 2002 is 69. In 2013, one person received a pancreas islet transplant.

Of all pancreas retrieved in 2013, five pancreas islets were not used for transplantation due to insufficient islets and a further 13 pancreas retrieved were used for pancreas islets research.

Figure 5.54

Recipients of Pancreas Islet Transplant by Type of Organ Donor
Australia 1998-2013





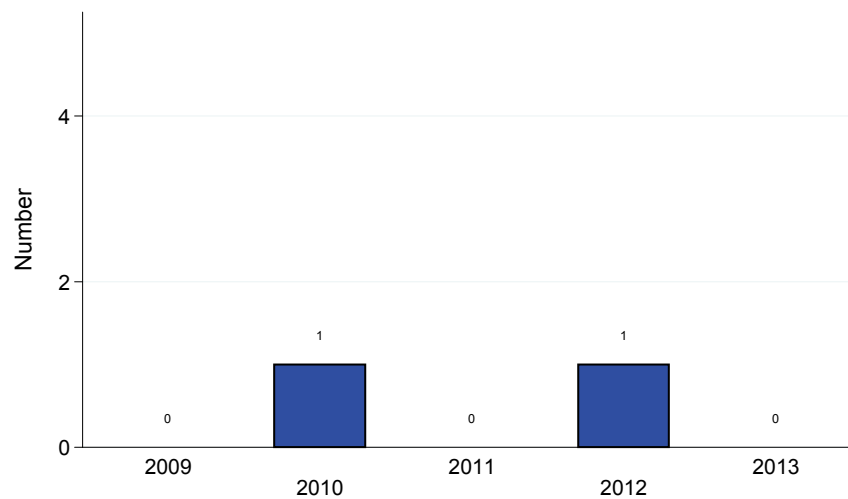
Intestine Donation

Adult and paediatric patients with irreversible intestinal failure and developing severe complications from parenteral nutrition can benefit from intestinal transplantation. Only two intestinal transplants have been performed in Australia; this is not yet a widespread treatment for irreversible intestinal failure.

The first successful intestinal transplant was performed at the Austin Hospital in Victoria, Australia in 2010.

Figure 5.55

Intestine Transplanted by Type of Organ Donor
Australia 2009-2013



Chapter 6

Tissue & Eye Data



in Australia and New Zealand



Tissue & Eye Data

While only a small percentage of people are medically suitable to donate solid organs upon death, a larger proportion are eligible to become eye and/or tissue donors. However, the majority of tissue donations occur from living donors.

In 2013 national tissue reporting continued to strengthen. Historically, there had been no consolidated collection or reporting of tissue and eye donation and utilisation data in Australia. The continued partnership between the Australian Organ and Tissue Donation and Transplantation Authority (AOTDTA), jurisdictional tissue and eye banks and the ANZOD Registry has strengthened the national reporting of tissue data for 2013. Reported datasets and analyses 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>.

This chapter presents the eye and tissue data provided by banks across Australia, in conjunction with data collected within the solid organ donation sector by DonateLife.

The aim for the ANZOD Registry is to continue delivering accurate data for the tissue and eye sectors. The goals going forward include the collection of donor specific data with the allocation of a unique donor identification, capturing outcome data and unifying terminology across agencies.

Collaboration with the Eye Bank Association of Australia and New Zealand (EBAANZ) is assisting the momentum for accurate reconciliation for reporting into the future.

The following Tissue Banks contributed data :

- ACT** - ACT Bone Bank
- NSW** - Australian Biotechnologies
- Hunter New England Bone Bank
- NSW Bone Bank
- Rachel Forster Bone Bank
- Sydney Heart Valve Bank
- QLD** - QLD Bone Bank
- QLD Heart Valve Bank
- SA** - SA Tissue Bank
- VIC** - Barwon Health Bone Bank Geelong
- Donor Tissue Bank Victoria
- WA** - Perth Bone and Tissue Bank (PlusLife)
- Royal Perth Heart Valve Bank

EBAANZ contributed data on the following Eye Banks in Australia and New Zealand :

- NSW** - Lions NSW Eye Bank
- QLD** - Queensland Eye Bank
- SA** - The Eye Bank of SA
- VIC** - Lions Eye Donation Service (Vic)
- WA** - Lions Eye Bank of WA
- NZ** - NZ National Eye Bank



Tissue & Eye Data



Tissue & Eye Donors

For 2013, tissue banks across Australia continued to provide aggregate data for 4,193 cardiovascular, musculoskeletal and skin tissue donations from a total of 4,032 tissue donors.

The EBAANZ reported on behalf of eye banks across Australia and New Zealand, including 1,144 eye donors in Australia and 159 in New Zealand.

Figure 6.1 Number of Tissue Donors, Australian States, 2012-2013

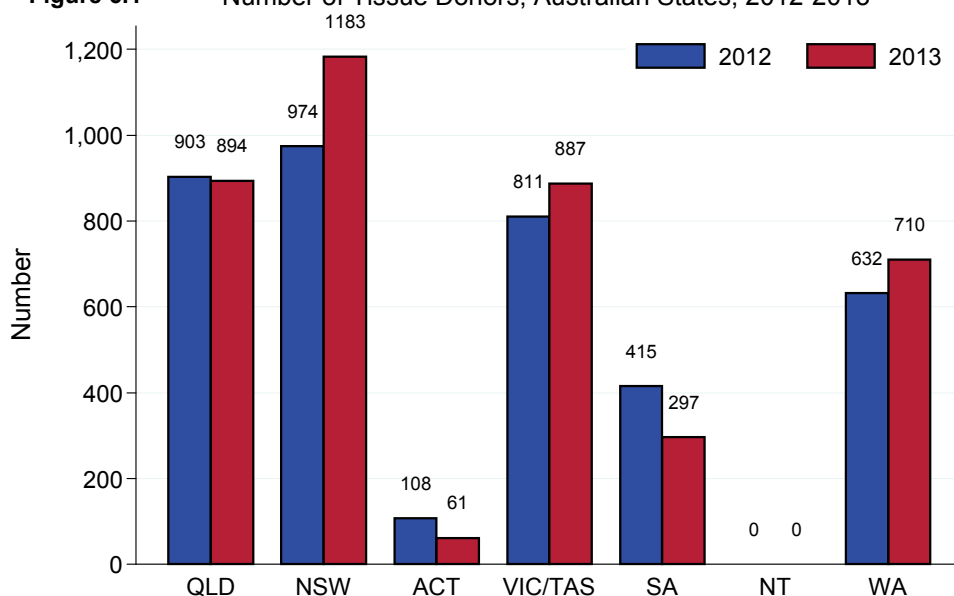


Figure 6.1 shows the number of tissue donors in each State (both living and deceased combined).

Each total number excludes duplicate counts of donors that are also multi-organ or multi-tissue donors where the donor coordination is performed by another donation agency.

This data is sourced from Australian Tissue Banks.

Figure 6.2 Number of Eye Donors, Australia and New Zealand, 2012-2013

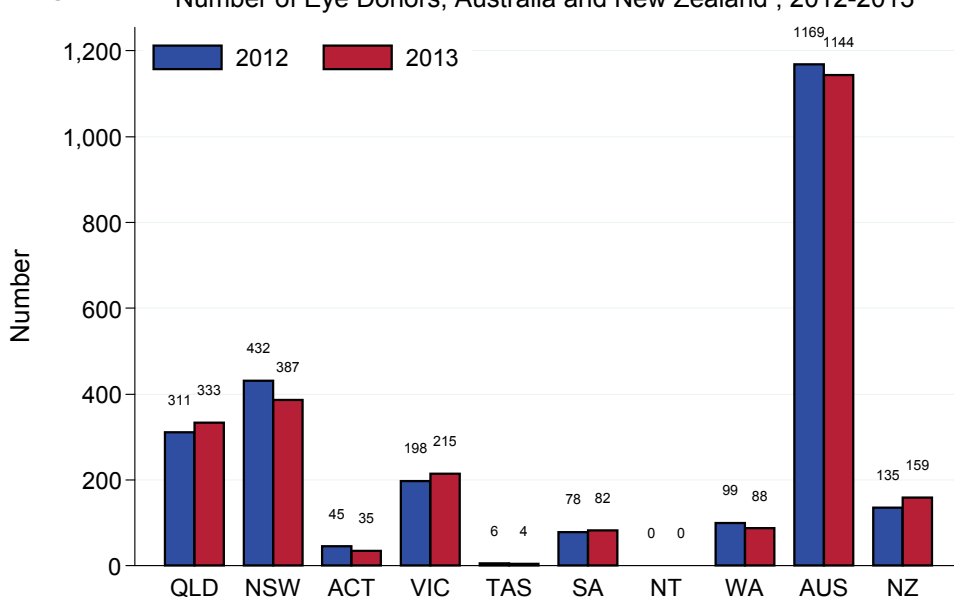


Figure 6.2 represents the number of eye donors from each State. Note that some States not having an Eye Bank manage eye donation from a satellite State.

Donor numbers may include eye donors that are also multi-organ or multi-tissue donors where the donor coordination is performed by another donation agency.

This data is sourced from the EBAANZ.



Tissue & Eye Data

Tissue Donation

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 can not be used for grafting. Using donated skin as a wound "dressing" helps reduce infection, fluid loss and pain, promotes wound healing

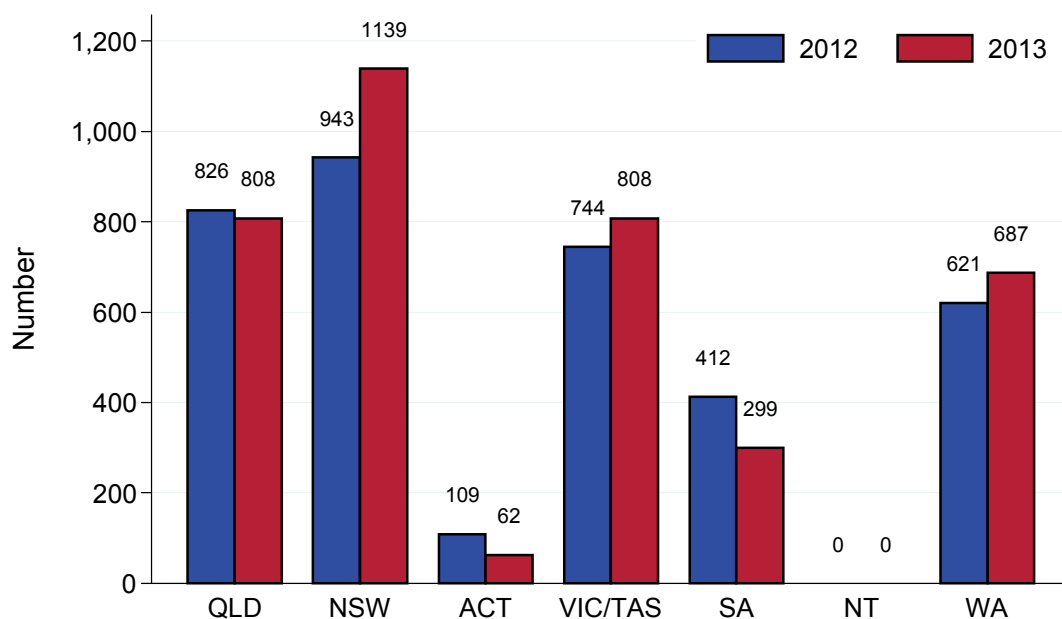
and minimises scarring. Often recipients will require more than one donated graft for their wounds to heal. Skin grafts are also used to treat wounds resulting from trauma and serious infection.

Among the 4,032 tissue donors in Australia during 2013, there were 3,803 tissue donations from live donors and 390 tissue donations from deceased donors. Donations from live donors (93% of all donations) consisted predominately of musculoskeletal tissue, where 3,783 people donated femoral heads whilst undergoing hip replacement surgery. Twenty live donors provided cardiovascular tissue, an increase from three in 2012. Tissue donation from live donors is managed by the individual tissue banks across Australia and New Zealand.

Figure 6.3 provides the breakdown by jurisdiction of the 3,803 tissue donations from live donors and similarly the breakdown by jurisdiction of 390 tissue donation from deceased donors is shown in Figure 6.4.

Figure 6.3

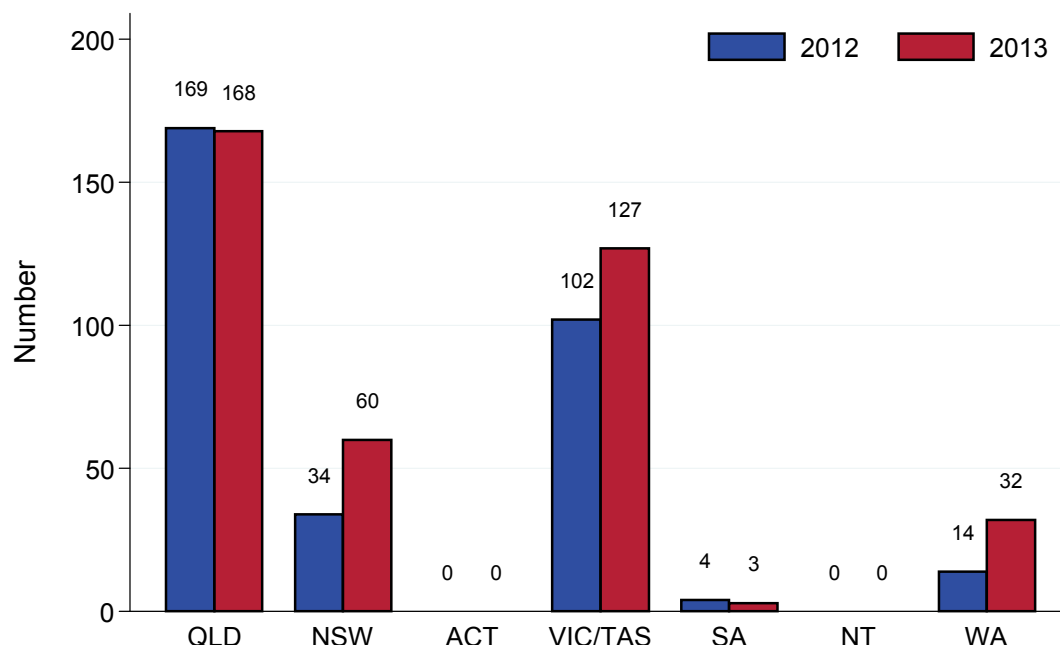
Living Tissue Donation by Australian States, 2012-2013



NSW had 17 and VIC had 3 cardiovascular tissue donors in 2013.

Tissue & Eye Data

Figure 6.4 Deceased Tissue Donation by Australian States, 2012-2013



Tissue donation from deceased donors in 2013 included donations from tissue only and solid organ/tissue donors. Combined, this consisted of 158 musculoskeletal tissue, 109 cardiovascular tissue and 123 skin tissue, for a total of 390 donations. Figure 6.5 shows the state of donation for tissue retrieved from deceased donors by tissue type and donation sector. Fifty five percent (216) of tissue retrieved from

deceased donors was from the tissue only sector, while 45% (174) was from the solid organ/tissue sector. Donors comprising the tissue only sector include 19 (9%) solid organ donors who did not proceed to solid organ retrieval, but continued to donate one or more tissues and 197 (91%) donors where solid organ donation was not a valid option and tissue only retrieval took place.

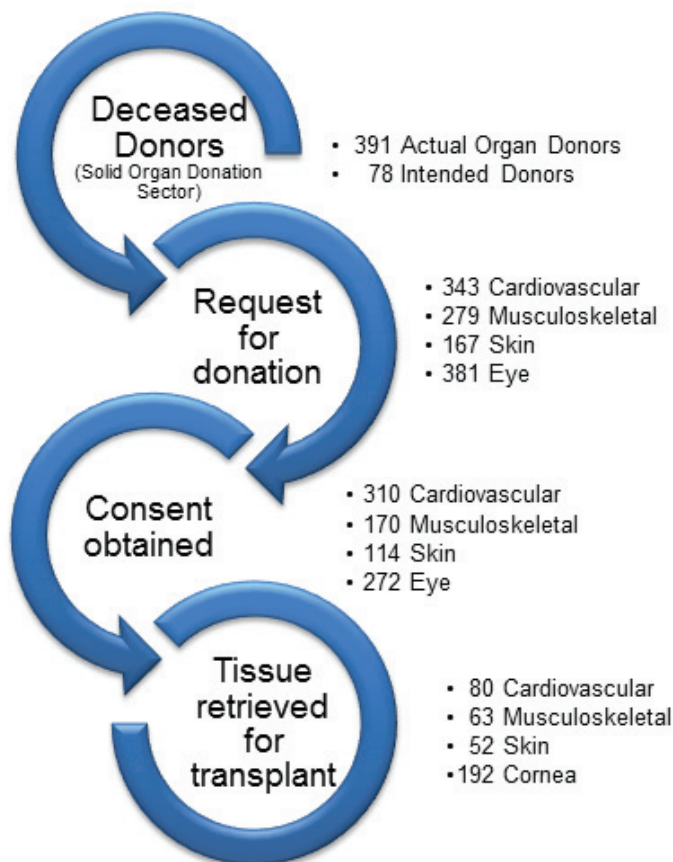
Figure 6.5

Tissue Donation from Deceased Donors in 2013 by State and Donation Sector									
State	Tissue Only Sector			Solid Organ/Tissue Sector			Tissue Total		
	ms	cv	skin	ms	cv	skin	ms	cv	skin
QLD	46	8	46	29	13	26	75	21	72
NSW	23	1	0	12	24	0	35	25	0
ACT	0	0	0	0	0	0	0	0	0
VIC/TAS	19	19	34	10	28	17	29	47	51
SA	0	0	0	0	3	0	0	3	0
NT	0	0	0	0	0	0	0	0	0
WA	13	7	0	6	6	0	19	13	0
AUSTRALIA	101	35	80	57	74	43	158	109	123
ms = musculoskeletal tissue cv = cardiovascular tissue									

Outcome of Request for Tissue Donation

Figure 6.6

Outcome of Request for Tissue Donation Australia 2013 (Deceased Solid Organ Donation Sector)



The outcome of request for tissue donation from the solid organ donation sector is displayed in Figure 6.6. DonatLife agencies across Australia provide data to ANZOD that includes tissue retrieved from either an actual or intended solid organ donor. This data may vary slightly from data supplied by tissue banks due to unidentified data duplication and mistaken identity of data from solid organ/tissue donors, in the event solid organ retrieval did not eventuate at the time. All effort however, is taken to report data without duplication of counts by reconciliation with tissue banks and the EBAANZ when indicated.

In 2013, there were a total of 387 tissue donations from a potential 469 donors who followed the solid organ donation pathway. These donors were consented for solid organ and tissue donation although retrieval of solid organs may or may not have proceeded. Of those donations, 16% (63) were musculoskeletal (up 5% from 2012), 20% (80) were cardiovascular (up 9% from 2012), 13% (52) were skin (up 5% from 2012) and 50% (192) were corneas.

Consent for eye donation can result in retrieval of two corneas. Cornea retrieved from donors from the solid organ donation sector account for 31% of deceased donors Australia wide.

Age of Tissue Donors

Of the 4,032 tissue donors across Australia, 4,004 donors had age reported. The average age was 64.8 years in 2013, with the youngest donor aged less than 6 months and the oldest donor aged 93.1 years.

Figures 6.7 to 6.9 represent the donor age by donor type, donor age by tissue type and donor age by retrieval state in Australia for 2013.

As with age, reporting gender was added to the collection after data collection commenced for 2013. As a result, 270 donors had gender reported as unknown, while 47% (1785) of the remaining donors were male and 53% (1977) were female. The average age of female tissue donors was slightly higher by 3 years compared to male tissue donors. The median age for tissue donors was 65.8 years.

Chapter 7

Organ Waiting Lists



in Australia and New Zealand



Organ Waiting Lists

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 outcome Registries. The details for individual organs are discussed below. In many cases more detailed information is contained in the annual reports of the relevant Registries. There are, however, important general considerations in interpretation of waiting list data.

Firstly, waiting list data is not necessarily a good indicator of actual demand for transplantation. There are many people who would benefit from transplantation who are not placed on waiting lists. This reflects the concept of “utility” in selection for transplantation; national consensus guidelines exist in this area (www.tsanz.com.au/organallocationprotocols/index.asp).

For example, listing on the kidney transplant waiting list requires an 80% expected survival at 5 years post transplantation.

Secondly, the reasons for removal from the list are not known in all cases. In some cases (particularly cardiothoracic and liver waiting lists) this may be due to improving health; conversely it may reflect deteriorating

health such that the risks of transplantation are no longer acceptable. Whether these people subsequently returned to the waiting list, remained off the list, or died without returning to the list is not known.

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”.

Residents of Australia or New Zealand who have transplants performed abroad may or may not be reported to local transplant outcome Registries and may or 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 list are subsequently re-listed. The figures in the tables refer to the lists at 1 January and 31 December of each year.



Organ Waiting Lists

Kidneys

Data for these waiting lists are derived from the relevant material from National Organ Matching System (NOMS) of Australia combined with material from the ANZDATA Registry. Among people on the deceased donor waiting list, some receive kidneys from living donors. However, most people who receive living donor kidneys are not already on the deceased donor waiting list. These two groups are illustrated separately.

Data is currently available only for Australia. Negotiations are currently underway to extend to the inclusion of New Zealand data.

Figure 7.1

Australian Deceased Donor Kidney Waiting List Stock and Flow Totals 2007 - 2013							
Event	2007	2008	2009	2010	2011	2012	2013
Active start of year	1339	1333	1251	1264	1183	1087	1073
Made active	592	653	670	630	707	736	762
Taken off list	167	182	178	149	197	153	140
Deceased donor transplant	315	417	401	499	533	554	581
Living donor transplant	95	122	64	58	62	45	54
Transplants abroad	8	2	4	1	2	0	1
Died on list	13	12	10	4	9	6	3
Died within 12mths of removal from list *	18	18	22	14	16	16	17
Active end of year	1333	1251	1264	1183	1087	1065	1056
Deceased donor transplant off list	29	42	45	51	37	53	49
Living donor transplant off list	176	232	263	238	193	193	198

* Classification is by year of death, not year of de-listing. If a de-listing is followed by a re-listing or a transplant from any source it is not counted as a death within 12 months of de-listing.



Organ Waiting Lists

Liver

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 Annual Report, based on returns from transplanting centres. More detailed analyses can be found in their Annual Report, at <http://www.anzltr.org/>.

Figure 7.2

Australian and New Zealand Deceased Donor Liver Waiting List Stock and Flow Totals 2008 - 2013

Event	2008	2009	2010	2011	2012	2013
Active start of year	199	169	175	194	192	186
Made active	290	335	335	336	347	358
Taken off list	48	69	46	68	60	72
Deceased donor transplant	229	228	248	253	268	279
Died on list	48	32	12	17	29	29
Active end of year	169	175	194	192	182	164

Data on liver transplants performed abroad and those who died within 12 months of removal from the list is not collected by the Australia and New Zealand Liver Transplant Registry.

Organ Waiting Lists

Cardiothoracic Organs

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 those supplied by the ANZCOTR, and include both Australia and New Zealand wait list data. Further material for each organ is available in the ANZCOTR Annual Report at <http://www.anzcotr.org.au/>.

Figure 7.3

Australia and New Zealand Deceased Donor Heart Waiting List Stock and Flow Totals 2008 - 2013

Event	2008	2009	2010	2011	2012	2013
Active start of year	61	52	51	53	78	78
Made active	113	110	103	117	108	105
Taken off list	24	33	17	7	15	19
Deceased donor transplant	90	71	76	76	85	86
Died on list	8	7	8	9	8	15
Active end of year	52	51	53	78	78	58

Data on cardiothoracic transplants performed abroad is not collected by ANZCOTR.

In Australia in 2013, there were 9 patients de-listed from the heart transplant waiting list and 10 patients de-listed from the lung transplant waiting list. These patients were “too sick” to survive a transplant procedure. The Registry does not collect further information on mortality status on this category of patients, after de-listing.

Figure 7.4

Australia and New Zealand Deceased Donor Lung Waiting List Stock and Flow Totals 2008 - 2013

Event	2008	2009	2010	2011	2012	2013
Active start of year	111	105	109	124	112	107
Made active	165	155	181	189	186	227
Taken off list	26	15	15	22	16	14
Deceased donor transplant	129	130	136	172	161	188
Died on list	16	6	17	13	14	14
Active end of year	105	109	124	112	107	108



Organ Waiting Lists

Pancreas

Data for the pancreas transplant waiting list is derived from data supplied by hospitals to the National Pancreas Transplant Registry. It includes both people waiting a combined kidney-pancreas transplant (the great majority) and those waiting a pancreas transplant (following a previous kidney transplant). It does not include people waiting for pancreas islet cell transplants.

Figure 7.5

Australian Deceased Donor Pancreas Waiting List Stock and Flow Totals 2012 - 2013

Year	Active at start of year	Made Active	Taken off list	Transplanted Deceased Donor	Died on list	Active at end of year
2012	43	60	16	37	2	48
2013	85	48	26	33	2	72

Data on pancreas transplants performed abroad and those who died within 12 months of removal from the list is not collected by the National Pancreas Transplant Registry.

Chapter 8

Organ Donation Outcome Data



in Australia and New Zealand



Outcome Data

This chapter summarises the outcomes for the solid organ transplants performed in Australia and New Zealand.

This information is supplied by the various transplant outcome registries, and reflects the outcomes of transplants performed across Australia and New Zealand.

For the first time this year, the various time points have been standardised, and graft survival is presented at 1 and 5 years. For each organ, the concept of graft survival is similar: sufficient organ function to maintain life without other organ replacement therapy. Thus the endpoints for graft survival analyses are death or re-transplantation of organs. For kidneys, return to dialysis also indicates a loss of graft function, and for pancreas transplant the recommencement of insulin therapy. The table shows the proportion of grafts functioning at 1 and 5 years, calculated using the Kaplan-Meier method.

Considerable further information is available for each organ at the websites of the relevant transplant outcome registries (anzdata.org.au; anzltr.org; anzcotr.org.au).

Figure 8.1

Graft Survival		
Organ	1 year	5 year
Liver transplants (Australia and New Zealand)¹	0.90	0.80
Pancreas transplant (Australia and New Zealand)²	0.90	0.88
Heart transplant (Australia)³	0.87	0.82
Lung transplant (Australia)³	0.91	0.63
Combined Heart/Lung transplant (Australia)³	0.61	0.61
Deceased donor Kidney transplant (Australia)⁴	0.92	0.83
Deceased donor Kidney transplant (NZ)⁴	0.90	0.78

1. All primary liver transplants, Australia and New Zealand. Courtesy of Australia and New Zealand Liver Transplant Registry. 1-year survival figures include grafts 2008-13; five year survival figures include grafts 2003-12. www.anzltr.org
2. Pancreas survival (pancreas component of combined kidney-pancreas transplants). All pancreata, Australia and NZ. Figures include all pancreas transplants performed 2005-13. Courtesy of Australia and New Zealand Pancreas Transplant Registry. (based at National Pancreas Transplant Unit, Westmead Hospital, Sydney).
3. Heart and lung and heart/lung combined figures, Australia only. Courtesy of Australia and New Zealand Cardiothoracic Organ Transplant Registry. 1-year survival figures include grafts 2004-13; five year survival figures include grafts 2004-2013 www.anzcotr.org.au
4. Kidney figures refer to recipients of kidney-only transplants from deceased donors. Courtesy of Australia and New Zealand Dialysis and Transplant Registry. 1-year survival figures include grafts 2006-12; five year survival figures include grafts 2006-12. www.anzdata.org.au

Glossary of Terms



in Australia and New Zealand



Glossary of Terms

Active Transplant Waiting List - This is the list of patients who have been through the assessment process and are fit and ready to receive a transplant. When a donor organ becomes available, the patient is included among those who are matched against the donor. It may sometimes be necessary to remove someone from the transplant list, either temporarily or permanently. This may be done, for example, if someone becomes too ill to receive a transplant. If a patient is suspended from the list, they are not eligible to receive a transplant and are not included in the consideration of any donor organs that become available.

Actual Donor - Definitions for this term can vary. The World Health Organisation consider an "Actual deceased organ donor" is a consented eligible donor from whom at least one organ was recovered for the purpose of transplantation. Historically the ANZOD Registry has used a slightly different definition of "a person from whom the retrieval operation is commenced for the purpose of transplantation". This includes donors who may be deemed medically unsuitable at time of surgery or after removal of organs.

Allocation - refers to the algorithm and process for determining to whom (from the waiting list of potential recipients) a given donated organ is offered. The algorithms determining allocation are pre-determined by a consensus process, and are available at the TSANZ website (www.tsanz.com.au).

Australia and New Zealand Organ Donation Registry (ANZOD Registry). The Registry collects and reports data for deceased organ donors. Data has been collected since 1989 in Australia and 1993 in New Zealand.

Body Mass Index (BMI) - is a calculation used as a measure of obesity (in adults). It is calculated as the quotient of weight and the square of height, in units of kg/m^2 .

Bone - Dense calcified tissue that forms the skeleton and supports the body. Bone can be donated and transplanted.

Brain Death - Brain death occurs when the brain function at all level is totally and irreversibly lost. This is determined by specialist doctors using a series of legally defined tests.

Cardiac (or circulatory) Death - Occurs when a person's heart stops and cannot be resuscitated. As with brain death, there is no recovery from cardiac death.

Cardiovascular (CV) Tissue - Cardiovascular tissue refers to heart valves which are necessary to regulate the flow of blood to and from the heart (see Heart Valves). Cardiovascular tissue can be donated and transplanted.

Cornea - The transparent outer covering of the eye's iris and pupil, forming the lens of the eye. Corneas can be donated and transplanted to restore sight for people with damaged corneas.

Deceased Donor - An individual from whom at least one solid organ is recovered for the purpose of transplantation after suffering brain death or cardiac death

Deceased Donor Transplant - The transplant of an organ, multiple organs or tissue from a deceased donor.

Glossary of Terms



Donation - The act of giving organ(s), tissue(s), or blood to someone else without compensation.

Donation after Brain Death (DBD)- Donation of human organ(s) and/or tissue(s) for transplantation that occurs after Brain death has been certified.

Donation after Circulatory Death (DCD) - Donation of human organ(s) and/or tissue(s) for transplantation that occurs after the circulatory system has stopped and cardiac death certified. Acronym is DCD.

Double Adult Kidney Transplant - describes dual kidney transplantation from a marginal adult deceased donor, where both kidneys are implanted separately with separate anastomoses into the one recipient.

En bloc Kidney Transplant - describes the transplant of both kidneys retrieved together with aorta as a single item. These are obtained from paediatric donors typically under 15 kg in weight, into a single recipient and using the donor aorta and vena cava for vascular anastomosis.

End-Stage Organ Disease - A disease that leads, ultimately, to permanent, complete failure of an organ to function. Some examples are emphysema (lungs), cardiomyopathy (heart), and polycystic kidney disease (kidneys).

Graft Survival - The length of time an organ functions successfully after being transplanted. The end-points for calculations of grafts survival are either loss of graft function (for example, return to dialysis or retransplantation) or the death of the patient

Heart - A muscular organ that pumps blood through the body. The heart can be donated and transplanted.

Heart Valves (HV) - Prevent the back flow or leakage of blood as it is being pumped through the chambers inside of the heart. Heart valves can be donated and transplanted.

Intended Donor - Definitions for this term can vary. An intended organ donor is a person for whom the donation work was initiated as evidenced by both:

- 1) Formal written consent undertaken, including consent for donation of specific organ+/- tissues, and
- 2) Blood for tissue typing sent with allocation of a donor number;

but donation did not proceed. Historically the ANZOD Registry has used a slightly different definition, "A person from whom authority has been given or volunteered, but organ donation did not proceed. (eg positive virology, cardiac arrest, further investigations discovered cancer, infection etc.)"

Intestines - The portion of the digestive tract extending from the stomach to the anus, consisting of the stomach, the upper segment (small intestine) and lower segment (large intestine.) The intestines can be donated and transplanted.

Intestinal transplants - A transplant carried out in a patient with intestinal failure who requires a transplant.



Kidneys - A pair of organs that maintain proper water and electrolyte balance, regulate acid-base concentration, and filter metabolic waste which is excreted as urine. Kidneys can be donated by deceased and living donors to be transplanted.

Living Donor - A person who donates an organ or tissue while alive.

Liver - A large reddish-brown organ that secretes bile and is active in the formation of certain blood proteins and in the metabolism of carbohydrates, fats, and proteins. The liver, like the kidneys, assists in the removal of waste and toxins from the blood stream. The liver can be donated by deceased donors, and a liver lobe (section) can be provided by a living donor to be transplanted. The donor's liver will grow to full size, and the transplanted lobe will too.

Lungs - The organs that enable breathing to take place, providing life-sustaining oxygen to the body and its organs. Air is inhaled into the lungs and oxygen in the air is exchanged for carbon dioxide which is then exhaled. The exchange happens in the blood as it circulates through the sponge-like lung tissue. The lungs can be donated and transplanted. Lung transplantation can refer to single lung, double lung or even a heart-lung transplantation. A lung lobe can also be donated by a live donor.

Multi-organ transplant - A transplant in which the patient receives more than one organ.

Musculoskeletal (MS) Tissue - Musculoskeletal tissue refers to bone, tendon and ligaments and related products and is utilised for knee and hip replacements, reconstructive orthopaedic surgery following trauma or disease, spinal deformities and can aid in prevention of limb loss following tumour removal.

National Organ Matching System (NOMS) - A national database maintained by the Australian Red Cross of all patients waiting for an organ transplant.

Organ - A part of the body, made up of various tissues, which performs a particular function. Transplantable organs are: heart, intestines, liver, lungs, kidneys, and pancreas.

Organ Donation - To give an organ or a part of an organ to be transplanted into another person. Organ donation can occur with a deceased donor, who can give kidneys, pancreas, liver, lungs, heart, intestinal organs, and with a live donor, who can give a kidney or a portion of the liver, lung, or intestine.

Organ Preservation - Methods used to maintain the quality of organs between removal from the donor and transplantation into recipient. These methods include preservation solutions, pumps, and cold storage. Preservation times can vary from 2 to 48 hours depending on the type of organ being preserved.

Pancreas - Long, irregularly shaped gland that lies behind the stomach. Some glands in the pancreas secrete insulin. Pancreas transplants give patients with diabetes a chance to become independent of insulin injections. In addition to insulin, the pancreas secretes digestive enzymes (into the small intestine) that aid in the digestion of proteins, carbohydrates, and fats. Pancreas can be donated and transplanted.

Pancreas Islets - are clusters of *pancreatic* cells that sense blood sugar levels and release insulin to maintain normal levels. Pancreas islets are endocrine tissue located in the pancreas. Pancreas Islets can be donated and transplanted.



Patient survival rate - The percentage of patients who are still alive (whether the graft is still functioning or not). This is usually specified for a given time period after transplant. For example, a three-year patient survival rate is the percentage of patients who are still alive three years after their first transplant.

Recipient - In the context of organ and tissue transplantation, this is the patient receiving the donated organ or tissue.

Request - Where families of suitable donors are asked to give consent to their loved one's organs and tissues to be used for transplant.

Retrieval - The surgical procedure of organ recovery. Also referred to as procurement.

Skin - This is the largest organ of the body and has several different functions (e.g., protection from infection, fluid balance, cooling). Skin grafts can save the life a burn victim and can provide severely scarred individuals with a better quality of life.

Split liver - A split liver transplant occurs when the donor liver is divided into segments and then transplanted. These segments may be transplanted into more than one recipient, or a segment could be transplanted into a child for whom an entire adult liver would be too large.

Tissue - A body part consisting of similar cells that perform a special function. Examples of tissues that can be transplanted are bones, corneas, heart valves, ligaments, veins, and tendons.

Transplantation - The transfer of cells (eg. stem cells), tissue, or organs from one person to another.

Transplant Recipient - A person who has received a tissue or organ transplant.

Waiting List - The list of patients registered to receive organ transplants. It is made up of sub-lists of patients waiting for specific organs, and is also (for some organs) broken down by blood group. When a donor organ becomes available, the matching system generates a specific list of potential recipients based on the criteria defined in that organ's allocation policy.

Ventilation - The mechanism by which a machine "breathes" for a patient when the patient is not able to breathe properly.



Supplement 1

Australia





Supplement 1 - Australia

Please refer to our website (<http://www.anzdata.org.au/anzod/v1/indexanzod.html>) to view the tables listed below.

Contents	Period
Table 1.0 DONOR NUMBERS FOR EACH STATE	1989-2013
Table 2.0 DONOR GENDER NUMBERS AND AGE GROUPS FOR EACH STATE	2009-2013
Table 3.0 NUMBER OF DONORS FROM EACH HOSPITAL - ACT	1898-2013
Table 3.1 NUMBER OF DONORS FROM EACH HOSPITAL - NSW	1898-2013
Table 3.2 NUMBER OF DONORS FROM EACH HOSPITAL - NT	1898-2013
Table 3.3 NUMBER OF DONORS FROM EACH HOSPITAL - QLD	1898-2013
Table 3.4 NUMBER OF DONORS FROM EACH HOSPITAL - SA	1898-2013
Table 3.5 NUMBER OF DONORS FROM EACH HOSPITAL - TAS	1898-2013
TABLE 3.6 NUMBER OF DONORS FROM EACH HOSPITAL - VIC	1898-2013
Table 3.7 NUMBER OF DONORS FROM EACH HOSPITAL - WA	1898-2013
Table 4.0 CAUSE OF DONOR DEATH IN EACH STATE AND AUSTRALIA	1989-2013
Table 5.0 CAUSE OF DONOR DEATH RELATED TO AUSTRALIAN STATES	1989-2013
Table 5.1 CAUSE OF DONOR DEATH RELATED TO AUSTRALIAN STATES - FEMALE	1989-2013
Table 5.1 CAUSE OF DONOR DEATH RELATED TO AUSTRALIAN STATES - MALE	1989-2013
Table 6.0-7.0 ORGANS AND TISSUE REQUESTED, BY DONOR STATE	2009-2013
Table 8.0 REASONS ORGANS NOT REQUESTED, BY DONOR STATE	1989-2013
Table 9.0 ORGANS CONSENT NOT OBTAININED, BY DONOR STATE	2009-2013
Table 10.0 ORGANS CONSENT OBTAININED, BY DONOR STATE	2009-2013
Table 11.0 SOLID ORGAN RETRIEVAL BY DONOR STATE	2013
Table 12.0 ORGAN RETRIEVED, BY DONOR STATE	2001-2013
Table 13.0 REASONS ORGANS NOT RETRIEVED BY DONOR, BY STATE	1989-2013
Table 14.0 REASONS ORGANS NOT RETRIEVED BY DONOR, BY STATE	2013
Table 15.0 ORGANS RETRIEVED IN EACH DONOR STATE BY RETRIEVAL STATE TEAM	1989-2013
Table 15.1 ORGANS RETRIEVED IN EACH DONOR STATE BY RETRIEVAL STATE TEAM	2013
Table 16.0 DONOR AGE RELATED TO TRANSPLANTED ORGANS	2004-2013
Table 17.0 OUTCOME OF ORGANS RETRIEVED IN AUSTRALIA	1989-2013
Table 18.0 OUTCOME OF ORGANS RETRIEVED IN AUSTRALIA, DONOR STATE	1989-2013
Table 18.1 OUTCOME OF ORGANS RETRIEVED IN AUSTRALIA, DONOR STATE	2013
Table 19.0 TRANSPLANTED SOLID ORGANS BY TRANSPLANTING STATE	1989-2013
Table 20.0-21.0 TRANSPLANTED SOLID ORGANS IN AUSTRALIA FROM ORGANS DONATED FROM AUSTRALIA OR NEW ZEALAND	1989-2013
Table 20.0-21.0 TRANSPLANTED SOLID ORGANS IN NEWZEALAND FROM ORGANS DONATED FROM AUSTRALIA OR NEW ZEALAND	1989-2013
Table 22.0 ORGANS DONATED FROM EACH AUSTRALIA DONOR STATE AND TRANSPLANTED IN AUSTRALIA OR NEW ZEALAND	1989-2013
Table 23.0 ORGANS DONATED FROM AUSTRALIA AND TRANSPLANTED IN AUSTRALIA OR NEW ZEALAND	1989-2013
Table 24.0 TRANSPLANTED SOLID ORGANS	1989-2013
Table 24.1 TRANSPLANTED SOLID ORGANS	2013



Supplement 2

New Zealand





Supplement 2 - New Zealand

Please refer to our website (<http://www.anzdata.org.au/anzod/v1/indexanzod.html>) to view the tables listed below.

Contents	Period
TABLE 1.0 SOLID ORGANS RETRIEVED BY DONOR STATE - NEW ZEALAND	1993-2013
TABLE 1.1 SOLID ORGANS RETRIEVED BY DONOR STATE - NEW ZEALAND	2013
TABLE 2.0 NUMBER OF DONORS FROM EACH HOSPITAL - NEW ZEALAND	1993-2013
TABLE 3.0 DONOR GENDER NUMBERS AND AGE GROUPS - NEW ZEALAND	1999-2013
TABLE 4.0 CAUSE OF DONOR DEATH RELATED GENDER AND AGE GROUP, FEMALES - NEW ZEALAND	1993-2013
TABLE 4.1 CAUSE OF DONOR DEATH RELATED GENDER AND AGE GROUP, MALES - NEW ZEALAND	1993-2013
TABLE 5.0 CAUSE OF DONOR DEATH RELATED IN NEW ZEALAND	1993-2013
TABLE 5.1 CAUSE OF FEMALE DONOR DEATH RELATED IN NEW ZEALAND	1993-2013
TABLE 5.2 CAUSE OF MALE DONOR DEATH RELATED IN NEW ZEALAND	1993-2013
TABLE 6.0 ORGANS REQUESTED BY DONOR STATE - NEW ZEALAND	2000-2013
TABLE 7.0 REASONS ORGANS NOT REQUESTED - NEW ZEALAND	1993-2013
TABLE 7.1 REASONS ORGANS NOT REQUESTED - NEW ZEALAND	2013
TABLE 8.0 ORGANS RETRIEVED IN NEW ZEALAND BY RETRIEVAL STATE TEAM	2003-2013
TABLE 9.0 REASONS ORGANS NOT RETRIEVED - NEW ZEALAND	1993-2013
TABLE 9.1 REASONS ORGANS NOT RETRIEVED - NEW ZEALAND	2013
TABLE 10.0 DONOR AGE RELATED TO TRANSPLANTED ORGANS RETRIEVED IN NEW ZEALAND	2013
TABLE 11.0 OUTCOME OF ORGANS RETRIEVED IN NEW ZEALAND	1993-2014
TABLE 12.0 TRANSPLANTED SOLID ORGANS, DONOR STATE TO DESTINATION STATE	1993-2013
TABLE 12.1 TRANSPLANTED SOLID ORGANS, DONOR STATE TO DESTINATION STATE	2013
TABLE 12.2 TRANSPLANTED SOLID ORGANS IN NEW ZEALAND, ORGANS DONATED FROM NEW ZEALAND OR AUSTRALIA	1993-2013
TABLE 12.3 TRANSPLANED SOLID ORGANS FROM NEW ZEALAND DONORS, ORGANS TRANSPLANTED IN NEW ZEALAND OR AUSTRALIA	1993-2013