The Thirty Third Report

Australia and New Zealand Dialysis and Transplant Registry

2010

Edited by

Stephen McDonald
Leonie Excell
Brian Livingston

Funded by

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Acknowledgments

ANZDATA Registry offers its most grateful appreciation to everyone who helped make this 33rd Annual Report possible, especially the professionals and the staff of all the Renal Units and Tissue Typing Laboratories, upon whose reporting of data this enterprise ultimately depends.

Suggested Citation

An example of suggested citation for this report is as follows:

.. [Author's name] ..
Peritoneal Dialysis .. [page numbers] ..
ANZDATA Registry Report 2010
Australia and New Zealand Dialysis and Transplant Registry
Adelaide, South Australia.

Editors: Stephen McDonald, Leonie Excell, Brian Livingston

Publications based upon ANZDATA Registry information reported here or supplied upon request, must include the citation as noted above and the following notice:

The data reported here have been supplied by the Australia and New Zealand Dialysis and Transplant Registry. The interpretation and reporting of these data are the responsibility of the Editors and in no way should be seen as an official policy or interpretation of the Australia and New Zealand Dialysis and Transplant Registry.

APPENDIX II - AUSTRALIA **(Available on CD and from website www.anzdata.org.au)**

CONTENTS

APPENDIX III - NEW ZEALAND **(Available on CD and from website www.anzdata.org.au)**

CONTENTS

The Registry acknowledges that the report is a tribute to the commitment and involvement of renal units throughout Australia and New Zealand. This commitment results in an enormous amount of time and work from staff of these units. It has ensured 100% of units in Australia and New Zealand participate and we continue to be confident that all the patients who have received chronic dialysis and transplantation treatments in Australia and New Zealand in this time period are included.

Lee Excell continued in her role as manager of the Registry for the bulk of 2010. Her retirement in December brings to a close a career with the Registry which has extended for almost 34 years. The Registry wishes to acknowledge her enormous contribution to its success. She was present at the inception of the Registry and has fostered and nurtured its development as arguably the most successful Registry of its type in the world. We are pleased that she will provide further advice and consultancy in the future.

Brian Livingston continues as information manager and Christina Leitch has continued to provide administrative support. Bio-statistical expertise has been provided by Hannah Dent and Nancy Briggs.

Associate Professor Stephen McDonald continues in his role as Executive Officer of the Registry. His intellectual and academic leadership of the Registry has maximised the dissemination of the data and its analysis both nationally and internationally.

In 2010 Dr Philip Clayton was appointed Amgen Fellow in Epidemiology. We look forward to his involvement with the Registry and believe that this position is a major stimulus for the academic output of the Registry. We are greatly indebted to Amgen who continue to make a commitment to the funding of this position.

The ANZDATA Registry Steering Committee has once again been chaired by Professor Steven Chadban. We thank Steven for his inspired leadership and his ongoing interest in the Registry and its operations and output.

Major funding for the Registry has been provided from the Australian Commonwealth Department of Health and Ageing through the Australian Organ and Tissue Donation and Transplant Authority, Kidney Health Australia and the New Zealand Ministry of Health.

We are also grateful to industry for support. Non-tied grants have been received from Amgen for the employment of the Epidemiology Fellow which continued in 2010.

Once again involvement of many individuals who have been members of the ANZDATA Registry committees and working groups are greatly acknowledged. The members of these groups are listed on Page vii. .

2010 has proven to be a year of major change and upheaval for the Registry. After 33 years being housed at The Queen Elizabeth Hospital a move to the Royal Adelaide Hospital occurred in February 2010. We also gratefully thank the South Australian Department of Health for providing housing at the Royal Adelaide Hospital for the Registry. It would not be possible for the activities of the Registry to occur without this in-kind support.

Graeme Russ
Chair ANZDATA Executive
December 2010

ANZDATA REGISTRY EXECUTIVE COMMITTEE

Professor Graeme Russ—Chair
A/Professor Stephen McDonald—Executive Officer
Mrs Leonie Excell—Registry Manager
Mr Brian Livingston—Information Manager

ANZDATA REGISTRY STEERING COMMITTEE (2010 MEMBERS)

Professor Steven Chadban—Chair
Professor Graeme Russ
A/Professor Stephen McDonald
Mrs Leonie Excell
Dr Fiona Brown (Project Manager—Peritoneal Dialysis)
Dr Scott Campbell (Project Manager—Transplantation)
A/Professor Francesco Ierino
Dr Matthew Jose (Indigenous Interest Group)
Dr Vicki Levidiotis (Project Manager—Parental/Neonatal Outcomes Group)
Dr Wai Lim
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Dr Timothy Mathew (Kidney Health Australia Representative)
Dr Steven McTaggart (Project Manager—Paediatric Group)
A/Professor Kevan Polkinghorne (Project Manager—Haemodialysis)
Dr Angela Webster (Project Manager—Cancer)
Dr Germaine Wong (Fellow in Cancer Epidemiology)
Ms Gillian Gorham (Nursing Representative)
Mr Damian Harding (Consumer Representative)

ANZDATA REGISTRY WORKING GROUPS (2009 MEMBERSHIP)

Transplant Working Group

Dr Scott Campbell (Project Manager)
A/Professor Stephen McDonald
Professor Graeme Russ
Professor Steven Chadban
Dr Wai Lim
Dr Shlomo Cohney

Cancer Working Group

Dr Angela Webster (Project Manager)
Dr Germaine Wong (Fellow in Cancer Epidemiology)
A/Professor Stephen McDonald
Professor Randall Faull
Professor Adrian Hibberd
Professor Jonathon Craig
Dr Rob Carroll

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Professor David Johnson
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A/Professor Johan Rosman
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Parental/Neonatal Outcomes Group

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Indigenous Interest Group

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Ms Gillian Gorham
Professor John Collins
Dr Mark Thomas
Dr Natasha Rogers
Dr Jacqueline Hughes
Lesley Salem

PRIVACY

In December 2001 changes to the Commonwealth Privacy Act were introduced which have led to changes to the collection of personal information. Essentially these extend to the private sector a number of changes based around 10 "National Privacy Principles" (NPP's). A detailed exposition of these can be found at the Privacy Commissioner's website (www.privacy.gov.au). Briefly, however, health information is treated as "sensitive" information, which must usually be collected and handled with consent of the person, unless certain conditions are met. Patients are entitled to view the information the Registry holds about them, and request alterations if the data is thought to be inaccurate.

Each Australian State has also enacted similar provisions which cover practice and patients in public hospitals.

ANZDATA does not release data identifiable by patient name. Results are published/released in tabular or graphic format only. Requests for data are met using deindentified data only. On occasion, when data identifying particular hospitals is involved, consent from the Director of the relevent renal unit is sought prior to the release of information.

COLLECTION OF DATA

ANZDATA spent some time during 2002 formulating an appropriate response to these issues including seeking advice from a variety of sources. The approach taken has been that of a "opt-out" consent, whereby patients are distributed information outlining the nature and purpose of the information collected, offered an opportunity to view that data and ask questions, and the opportunity to request withdrawal of part or all of their data. This approach is explicitly suggested for Registries by the Privacy Commissioner in his "Guidelines for the Health Sector". To this end ANZDATA has circulated to all participating hospitals a patient information sheet (see opposite), for each hospital to use (or a locally modified version if appropriate) to inform patients.

At the time of data collection each unit is asked to certify that they have complied with measures under the relevant privacy measures.

Tissue Typing Data and Transplant Waiting List data are collected in each Tissue Typing Laboratory and entered into the National Organ Matching System database. These data are transmitted to ANZDATA for inclusion in the ANZDATA database and for this Report.

ANZDATA REGISTRY

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Important Privacy Information

As part of routine medical care of people receiving treatment with dialysis or kidney transplantation, your kidney specialist collects certain information about the patients they treat. All kidney specialists throughout Australia and New Zealand report this information every twelve months to the Australia and New Zealand Dialysis and Transplant Registry (ANZDATA). ANZDATA collects the information for the purpose of monitoring treatments and performing analyses to improve quality of care for people with kidney failure.

1. What is ANZDATA ?
ANZDATA is an organization set up by Kidney Health Australia and the Australia and New Zealand Society of Nephrology to monitor dialysis and transplant treatments. ANZDATA is funded by the Australian and New Zealand Governments and Kidney Health Australia.

2. What information is collected about you ?
This information includes your name, age, gender, racial origin, hospital of treatment, some aspects of your medical condition (such as whether you have diabetes) and details about the type of kidney treatment you are receiving (dialysis or transplant).

We **DO NOT** collect details about your address, telephone number, medical insurance, or non-medical matters such as occupation, income, etc.

3. Is personal data ever released ?
The identity of people in the database **IS NOT released publicly nor in any reports**. Measures have been put into place to ensure the security of all collected information.

4. What is this information used for ?
The information is used primarily for quality assurance, investigating patterns of kidney disease, and planning appropriate health services. We release reports on a variety of topics, including an Annual Report examining the rates and treatment of kidney failure in Australia and New Zealand. We also have a major role in ensuring the quality of patient care by sending to each kidney unit each year a report outlining their activity. These reports also compare the outcome of the treatment they provide with that of other units throughout the two countries. Reports are also produced at a state and national level, and from time to time analyses are also produced for renal units, government health departments and industry concentrating on particular aspects of renal failure management eg peritoneal dialysis, transplantation, haemodialysis.

5. **Can you see what personal information ANZDATA collects and the reports that it produces ?**
Individuals are able to view their own information on request. You can request alterations if you believe it is inaccurate. You may also opt not to have your treatment included in this database, and you should let your kidney specialist know if this is the case. You can also choose not to have some information (eg racial origin) recorded. However, if your information is not included in the Registry, the ability to compare results in Australia and New Zealand or to analyse the results of different treatment methods and for different patient types (eg diabetics) will be compromised.

The national reports and much other material produced by ANZDATA are available free on the Internet at www.anzdata.org.au, or they can be sent to you on request to the address above. Your kidney specialist will also have copies of many of the reports.

If you wish to discuss any of the issues raised here, please let your doctor know or telephone the ANZDATA Registry direct on [08] 8222 0949. You may also write to us (ANZDATA Registry, C/- Royal Adelaide Hospital, DX800, Mail Point 117, North Terrace, Adelaide, SA. 5000) or send us an e-mail (anzdata@anzdata.org.au).

GUIDELINES FOR DATA RELEASE

The policy for release of data to investigators, renal units and others was revised during 2002 and is summarised on the Website. ANZDATA encourages the analysis, use and citation of its data, and receives many data requests annually which vary in size and complexity. At times these overwhelm the limited resources within the Registry, and must be prioritised. Generally, formal requests for data are preceded by a period of consultation with a member of the Registry staff. Requests are welcome from Renal Physicians, other staff members of Renal Units, Charitable Bodies, Academic Institutions, Government Departments and Industry. Requests dealing with identifiable Hospital data (ie data which identifies outcomes of an individual hospital) will only be fulfilled with the explicit consent of the Heads of the relevant Hospital Units. Individual patient identified data (names) is not released.

ATTRIBUTION OF PUBLICATIONS

The policy on attribution of publications which incorporate ANZDATA sourced data was revised during 2002, following a period of consultation with participating physicians.

Where a member of a participating unit has analysed data provided by ANZDATA and subsequently prepared a manuscript, then “ANZDATA Registry” should be acknowledged as a secondary institution in addition to the author’s Hospital or University. This applies whether the primary data analysis is performed by the author or by ANZDATA staff. Where the author is an ANZDATA office holder or staff member then the primary attribution should be “ANZDATA Registry”.

Where ANZDATA data is only a minor portion of the work, then it may be more appropriate to acknowledge the source explicitly in the “Acknowledgements” section.

In both cases the disclaimer on page ii of this report should be included.

In all cases the source and treatment of the data should be made clear in the “Methods” section. Preferably the abstract (and keywords if applicable) should also include “ANZDATA” which would allow for searching Registry publications.

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A number of definitions given below are used throughout this report unless otherwise stated.

1. Wording

Throughout this report 'treatment' refers to renal replacement therapy, including haemodialysis, peritoneal dialysis and transplantation. In places the word "graft" (or "allograft") is used for kidney transplant.

HD = haemodialysis CAPD = continuous ambulatory peritoneal dialysis APD = automated peritoneal dialysis
ESKD = end stage kidney disease

2. Data collection

ANZDATA collects information from all renal units in Australia and New Zealand. Data collection occurs at two time points. Key events (new patients, deaths, transplants) are notified as they occur, with units requested to send this at least monthly. This can occur either via a web-based interface or paper submission. An extensive cross-sectional survey is then performed twelve monthly (for data to 31st December). Currently this is by a paper-based system, with manual completion of the form and manual data entry. No formal audit mechanism is in place at this stage.

For kidney transplants, HLA matching and panel reactive antibodies are obtained direct from the Tissue Typing laboratories in each State.

Monthly summaries are distributed to the contributing units. Results contained in this (and other reports) are based on a final database locked and prepared after the end of year survey returns are received.

3. Inclusion criteria

Included in the Registry are all patients resident in Australia or New Zealand receiving renal replacement therapy where the intention to treat is long-term, ie medical opinion is that renal function will not recover. Cases of acute renal failure are excluded. People who move overseas permanently are censored at date of last treatment (or departure in the case of transplant recipients).

4. Modality attribution

The initial mode of dialysis is determined at 90 days after first treatment, to allow for early changes and maturation of access. Other transfers (between modalities, or from satellite to hospital haemodialysis etc.) are not analysed if less than 30 days, except for transfers between dialysis centres to which a 60 day rule is applied to allow for holiday movements.

5. Underlying renal disease

This is recorded by the treating hospital according to a modified EDTA coding system (details on back of survey form).

6. Deaths

Death rate is predominantly reported as number of patients died/total number of years of treatment of all patients treated at any time during the year. It is expressed as deaths per 100 patient years (pt yrs) at risk.

7. Comorbid conditions

These are recorded by the treating hospital. No formal definitions are supplied; the treating clinician is asked to record whether the patient has coronary artery disease, chronic lung disease, cerebrovascular disease, peripheral vascular disease or diabetes according to their clinical opinion on a yes / suspected / no basis.

8. Transplant Waiting List

The active transplant waiting list is based on data from the ARCBS Tissue Typing Laboratories, cross-checked with ANZDATA. Waiting list analyses are for patients' status at 31st December 2009.

9. Derived measures

9.1 Haemoglobin

Haemoglobin is recorded as the last available measurement before the end of the survey period.

9.2 Erythropoietic agents

Erythropoietin agent use is recorded as "yes" if these agents were used at any time during the survey period.

9.3 Iron studies

Iron studies are requested within the last three months of the survey period.

9.4 Estimated creatinine clearance

Where creatinine clearance is estimated from serum creatinine at entry or post transplantation, the Cockroft-Gault equation is used [1].

$Cl_{Cr}=(140\text{-age})*\text{weight} / (814*Cr_{serum})$[*0.85 if female]

The weight term used for this is lean body mass, calculated using the equation LBW=(0.9*[height-152])+(50 if male, 45.5 if female) [2].

9.5 Urea reduction ratio / Kt/V

Results are requested in one of these formats, using the stop flow method on a mid-week dialysis. Single pool Kt/V is collected, along with the method used. For conversion of URR to Kt/V urea the formula used [3] is

Kt/V = 0.023*PRU - 0.284 (note that PRU = percent reduction in urea and not URR).

9.6 Body mass index

Body mass index (BMI) is calculated as $\frac{\text{weight (kg)}}{(\text{height (m)})^2}$

The categories used are : underweight <20 kg/m^2 , normal 20-24.9 kg/m^2, overweight 25-29.9 kg/m^2, obese>=30 kg/m^2

9.7 Peritoneal dialysis measures

These are the standard measures, often calculated by computerised patient management programs.

9.7.1 Residual renal function

The measure used is the arithmetic mean of urea and creatinine clearance from a 24-hour urine collection and serum creatinine and urea.

9.7.2 Peritoneal equilibration test

The ratio of dialysate to plasma glucose is used, following a 4 hour dwell of a 2 litre 2.5% bag of dialysate, performed within 6 months after initiation of peritoneal dialysis.

10. Rates and Measures

10.1 Incidence rates

Except where otherwise stated, quoted incidence rates are per calendar year, and are expressed per million population.

10.2 Prevalence rates

Except where otherwise specified, prevalence rates are point prevalence rates at 31st December 2009.

10.3 Population denominator

The population estimates used are the estimated resident populations (ERP) for the year 2009, released by the Australian Bureau of Statistics and Statistics New Zealand. Figures used are those for the June quarter.

For both countries, the statistics bureaux record indigenous status on a self-identification basis For Australia, there has been considerable change in the propensity to self-identify as indigenous, such that a number of `estimates are released by the ABS [4]. For this report, the low range projections have been used.

10.4 Survival rates

For transplant recipients, survival rates exclude those who were transplanted overseas or were recipients of multiple organ grafts.

Graft survival (unless otherwise qualified) includes both cessation of graft function (ie return to dialysis) and patient death.

Rates for patient survival for fixed periods for transplantation are calculated according to the life-table method and thus include an adjustment to the risk-set of ½ of those censored without failure over the interval to create an “average” risk set.

10.5 Graft survival

For outcomes of kidney transplants, graft failure includes both loss of graft function (ie return to dialysis) and death of patients (with graft function). Calculations of patient survival for transplant recipients includes all subsequent modalities (i.e. deaths after graft failure are included). Patients transplanted overseas are excluded from calculations.

10.6 Dialysis Survival

Patient and technique survivals for haemodialysis and peritoneal dialysis are based on the dialysis modality at 90 days after first treatment for patients not transplanted during that period. Patients are followed up until they are either transplanted (at which point they are censored) or until they have a 'permanent' change of dialysis modality or until death or most recent follow up date. A 'permanent' change of dialysis is defined as any change in excess of 30 days.

Peritonitis survivals are calculated from first peritoneal dialysis (ignoring all earlier treatments) to date of first peritonitis episode. If there were no episodes of peritonitis then calculation is censored at change of treatment from peritoneal dialysis to haemodialysis or transplantation. Peritoneal dialysis includes automated peritoneal and continous ambulatory peritoneal dialysis. Excluded are patients who had peritonitis before commencing peritoneal dialysis.

10.8 Death and other event rates

Rates are expressed per 100 person years at risk (unless otherwise stated). Some analyses include survival of all patients, others exclude the first 90 days of followup. This is stated in the individual analyses.

10.9 Age standardisation

All rates are crude, not age-standardised. The age distribution of the populations for Australia and New Zealand are given in Appendix I.

10.9 Peritonitis rates

Peritonitis rates are present using episodes of peritonitis reported during periods of peritoneal dialysis - episodes reported prior to commencement of peritoneal dialysis (for example between Tenckhoff catheter insertion and commencement of peritoneal dialysis) are not included in these calculations.

11. Database

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

12. Statistics

Statistical analyses were performed using STATA version 11.

13. References

1. Cockcroft DW, Gault MH: Prediction of creatinine clearance from serum creatinine. Nephron 1976: 16;31-41.
2. Zasadny KR, Wahl RL: Standardized uptake values of normal tissues at PET with 2-[fluorine-18]-fluoro-2-deoxy-D-glucose: variation with body weight and method for correction. Radiology 1993: 189;847-850.
3. Basile C, Casino F, Lopez T: Percent reduction in blood urea concentration during dialysis estimates Kt/V in a simple and accurate way. Am J Kidney Dis 1990: 15;40-45.
4. Australian Bureau of Statistics: Experimental Projections of the Aboriginal and Torres Strait Islander Population. Canberra, ABS Cat. No. 3101.0, 2002.

Parent hospitals are listed below. In some cases, these have combined as part of a regional network and this is also indicated. The definition of a 'parent hospital' is a pragmatic one, and refers to units which offer a full range of dialysis services (i.e. can commence patients on dialysis, have on-site nephrologist presence and can deal wtith patients of all degrees of complexity).

In contrast, satellite units (see Page xvii) provide haemodialysis treatments to selected patients, usually with lower staff ratios and no on-site nephrologist.

QUEENSLAND

Allamanda Private Hospital (Fresenius)
Bundaberg Base Hospital
Cairns Base Hospital
Chermside Dialysis Unit (Fresenius)
Child and Adolescent Renal Service
Goldcoast Hospital
Henry Dalziel Dialysis Centre (Greenslopes) (Baxter)
Hervey Bay Hospital
John Flynn Hospital
Mackay Base Hospital
Princess Alexandra Hospital
  Queensland Renal Transplant Service
Rockhampton Base Hospital
Royal Brisbane Hospital
St Andrew's Dialysis Clinic (Diaverum)
Sunshine Coast Health District
  Caloundra Private Hospital
  Nambour General Hospital
  Nambour Selangor Private Hospital
The Townsville Hospital
Toowoomba Hospital
Wesley Private Hospital

NEW SOUTH WALES

Coffs Harbour Hospital
Dubbo Base Hospital
East Coast Renal Service
  Prince of Wales Hospital
  St. George Hospital
  St. Vincent's Hospital
  Sydney Children's Hospital
  Wollongong Hospital
Gosford Hospital
John Hunter Hospital
Lismore Hospital
Lismore Private Dialysis Clinic
Macleay Dialysis Centre - Kempsey
Manning Rural Referral Hospital
Mater Misericordiae Hospital
Mayo Private - Taree
Port Macquarie Base Hospital
Port Macquarie Private Hospital
Royal North Shore Hospital
South West Sydney Renal Services
  Liverpool Hospital
Statewide Renal Services
  Concord Hospital
  Royal Prince Alfred Hospital
Sydney Adventist Hospital
Tamworth Hospital
The Children's Hospital at Westmead
The Tweed Hospital
Western Renal Network
  Nepean Hospital
  Orange Hospital
  Westmead Hospital

AUSTRALIAN CAPITAL TERRITORY (ACT)

The Canberra Hospital

VICTORIA

Alfred Hospital
Austin Health
Eastern Health Integrated Renal Services
Epworth Hospital
Forest Hill Dialysis Centre (Fresenius)
Geelong Hospital
Kew Private Dialysis Centre
Malvern Dialysis Centre (Fresenius)
Monash Medical Centre – Adult
Monash Medical Centre – Paediatric
North West Dialysis Service
Royal Melbourne Hospital
Royal Children's Hospital
St. Vincent's Hospital
Western Health

TASMANIA

Launceston General Hospital
Royal Hobart Hospital

SOUTH AUSTRALIA

Flinders Medical Centre
The Queen Elizabeth Hospital
Royal Adelaide Hospital
Women's and Children's Hospital

NORTHERN TERRITORY

Alice Springs Hospital
Royal Darwin Hospital

WESTERN AUSTRALIA

Fremantle Hospital
Hollywood Private Hospital
Princess Margaret Hospital for Children
Royal Perth Hospital
Sir Charles Gairdner Hospital
St. John of God Private Hospital

NEW ZEALAND

Auckland City Hospital
Starship Children's Hospital
Christchurch Hospital
Dunedin Hospital
Hawkes Bay Hospital
Middlemore Hospital
Palmerston North Hospital
Taranaki Base Hospital
Waikato Hospital
Wellington Hospital
Whangarei Area Hospital

QUEENSLAND

Queensland Renal Transplantation Service
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NEW SOUTH WALES

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Women's and Children's Hospital
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WESTERN AUSTRALIA

Princess Margaret Hospital for Children
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Royal Perth Hospital
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Wellington Street
Perth 6001

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Starship Children's Hospital
Director - Dr William Wong
Park Road
Grafton, Auckland

Wellington Hospital
Director - Dr Grant Pidgeon
Riddiford Street
Newtown, Wellington South

QUEENSLAND
Atherton Private Hospital - Cairns Base Hospital
Cairns Home Training Unit - Cairns Base Hospital
Cairns Private Hospital Satellite - Cairns Base Hospital
Cooktown Satellite - Cairns Base Hospital
East Street Self Care Dialysis Unit - Rockhampton Hospital
Gympie Satellite - Sunshine Coast Health District
Home Hill Satellite - Townsville Hospital
Innisfail Hospital - Cairns Base Hospital
Ipswich Satellite - Princess Alexandra Hospital
Kingaroy Satellite - Toowoomba Hospital
Logan Satellite - Princess Alexandra Hospital
Mossman Satellite - Cairns Base Hospital
Mt. Isa Satellite - Townsville Hospital
Noosa Satellite - Sunshine Coast Health District
North Lakes Dialysis Unit - Royal Brisbane Hospital
North Ward Satellite - Townsville Hospital
Palm Island Satellite - Townsville Hospital
Redcliffe Satellite - Royal Brisbane Hospital
Redlands Satellite - Princess Alexandra Hospital
St Vincent's Robina Satellite - Goldcoast Hospital

NEW SOUTH WALES
Armidale Hospital -Tamworth Hospital
Auburn Satellite - Westmead Hospital
Ballina Hospital - Lismore Hospital
Bankstown Hospital - South West Sydney Renal Services
Bathurst Satellite Dialysis Centre - Orange Hospital
Bega Satellite - Statewide Renal Services
Blacktown Regional Dialysis - Westmead Hospital
Bondi Dialysis Unit (Diaverum)
Brewarrina Hospital
Broken Hill Hospital
Campbelltown Satellite - South West Sydney Renal Services
Coonamble Hospital
Dame Eadith Walker - Statewide Renal Services
Eora Satellite - Prince of Wales Hospital
Fairfield Satellite - South West Sydney Renal Services
Forbes Hospital - New South Wales
Gosford Satellite - Gosford Hospital
Goulburn Satellite (Fresenius) - Statewide Renal Services
Grafton Hospital - Lismore Hospital
Griffith Base Hospital - Statewide Renal Services
Invarell Satellite - Tamworth Hospital
Lakehaven Satellite - Gosford Hospital
Lanceley Cottage - Royal North Shore Hospital
Lindfield Dialysis Unit (Diaverum)
Liverpool Community Centre - South West Sydney Renal Services
Maitland Hospital - Hunter New England Health
Mona Vale Satellite - Royal North Shore Hospital
Moree Satellite - Tamworth Hospital
Moruya Satellite (Fresenius) - Statewide Renal Services
Muswellbrook - Hunter New England Health
Norfolk Island Hospital - Statewide Renal Services
Penrith Community Dialysis Centre - Nepean Hospital
Shellharbour - Wollongong Hospital
Shoalhaven Satellite (Nowra) - Wollongong Hospital
Singleton Satellite - Hunter New England Health
Sutherland Hospital - St George Hospital
Sydney Dialysis Centre - New South Wales
Taree Community Dialysis - Hunter New England Health
Wagga Wagga Base Hospital
Wansey Satellite - Hunter New England Health
Wellington Hospital - New South Wales
Wollongong Satellite - Wollongong Hospital - New South Wales

AUSTRALIAN CAPITAL TERRITORY (ACT)
Canberra Community Satellite
Northside Dialysis Clinic (Fresenius)

VICTORIA
Angliss Hospital
Ararat Hospital
Austin Training Satellite - Austin Health
Bairnsdale Regional Health
Ballarat Health Service
Bendigo Hospital
Box Hill Satellite - Eastern Health Integrated Renal Services
Broadmeadows Satellite
Brunswick Satellite
Casey Hospital - Berwick
Casterton Hospital
Caulfield General Medical Centre
Coburg Satellite
Cohuna Hospital
Colac Hospital
Craigieburn Satellite
Cranbourne Satellite
Dandenong Satellite
Daylesford Hospital
Diamond Valley Dialysis Clinic (Diaverum)
Donald Hospital
Echuca Hospital
Edenhope Hospital
Epping Dialysis Unit
Frankston Satellite
Goulburn Valley Hospital
Hamilton Hospital
Hastings Hospital
Heidelberg Hospital - Austin Health

VICTORIA (CONTINUED)
Horsham Satellite
Kyneton Hospital
Latrobe Regional Satellite
Mansfield District Hospital
Maroondah Satellite
Maryborough Hospital
Melton Hospital
Mildura Hospital
Moorabbin Satellite
Myrtleford Hospital
Newcomb Satellite
Nhill Hospital Satellite
Northern Hospital Satellite - Royal Melbourne
North East Kidney Service - Austin Health
North Melbourne Dialysis Clinic (Diaverum)
Orbost Hospital
Peter James Centre
Portland District Health
Robinvale Hospital
Rosebud Hospital
Sale Hospital
Sandringham Satellite
Seymour Hospital
South Geelong Satellite - Geelong Hospital
St. George's Hospital
Sunshine Satellite Centre - Western Health
Swan Hill Hospital
Wangaratta Hospital
Warrnambool Hospital
Werribee Mercy Hospital
Western Gippsland Hospital
Williamstown Satellite
Wodonga Regional Health Service
Wonthaggi Hospital
Yarawonga District Hospital
Yarram Hospital

TASMANIA
North West Renal Unit, Burnie - Launceston Hospital

SOUTH AUSTRALIA
Berri Satellite
Ceduna Hospital
Clare Satellite
Hampstead Rehabilitation Satellite
Hartley Private Hospital (Fresenius)
Lyell McEwin Satellite
Millicent Hospital
Modbury Satellite (Fresenius)
Mount Gambier Satellite
Murray Bridge Hospital
Noarlunga Satellite
Payneham Satellite (Baxter)
Port Augusta Hospital
Port Lincoln Satellite Centre
Wayville Satellite Centre
Whyalla Satellite Centre

NORTHERN TERRITORY
Flynn Drive Satellite - Alice Springs Hospital
Katherine Dialysis Unit - Royal Darwin Hospital
Nightcliff Community Centre - Royal Darwin Hospital
Palmerston Satellite - Royal Darwin Hospital
Tennant Creek Hospital - Alice Springs Hospital
Tiwi Dialysis Centre - Royal Darwin Hospital

WESTERN AUSTRALIA
Albany - John Hortin Dialysis Unit
Armadale Satellite
Bunbury Satellite
Busselton Satellite
Cannington Dialysis Clinic (Diaverum)
Derby Satellite
Geraldton Hospital
Joondalup Satellite
Kalgoorlie Dialysis Unit
Kimberley Dialysis Centre - Royal Perth Hospital
Melville Satellite
Midland Private Dialysis Centre (Baxter)
Peel Health Campus - Mandurah
Port Hedland Dialysis Unit (Pilbara)- Royal Perth Hospital
Rockingham Satellite
Spearwood Satellite
Stirling Dialysis Clinic (Diaverum)

NEW ZEALAND
Auckland Home Training Unit
Bay of Islands Hospital - Whangarei Hospital
Carrington Satellite - Auckland City Hospital
Grafton Training Unit - Auckland City Hospital
Greenlane Hospital - Auckland City Hospital
Manukau Satellite - Middlemore Hospital
Middlemore Satellite - Middlemore Hospital
Nephrocare - Auckland
Nelson Hospital
Porirua Community Dialysis - Wellington Hospital
Rotarua Hospital - Waikato Hospital
Tauranga Hospital - Waikato Hospital
Waitakere Satellite - Auckland City Hospital

Publications in peer-reviewed journals based substantially on data from ANZDATA and released during the period of data covered by this report (2009) and during 2010 are listed below.

2009

1. Yeates, KE, Cass, A, Sequist, TD, McDonald, SP, Jardine, MJ, Trpeski, L & Ayanian, JZ: Indigenous people in Australia, Canada, New Zealand and the United States are less likely to receive renal transplantation. *Kidney Int*, 2009.

2. Villar, E, Polkinghorne, K, Chang, S, Chadban, S & McDonald, S: Effect of type 2 diabetes on mortality risk associated with end-stage kidney disease. *Diabetologia*, In Press**:** 10.1007/s00125-009-1525-2, 2009.

3. Stewart, JH, Vajdic, CM, van Leeuwen, MT, Amin, J, Webster, AC, Chapman, JR, McDonald, SP, Grulich, AE & McCredie, MRE: The pattern of excess cancer in dialysis and transplantation. *Nephrol. Dial. Transplant.***:** gfp331, 2009.

4. Siva, B, Hawley, CM, McDonald, SP, Brown, FG, Rosman, JB, Wiggins, KJ, Bannister, KM & Johnson, DW: Pseudomonas Peritonitis in Australia: Predictors, Treatment, and Outcomes in 191 Cases. *Clin J Am Soc Nephrol*, 4**:** 957-964, 2009.

5. O'Shea, S, Hawley, C, McDonald, S, Brown, F, Rosman, J, Wiggins, K, Bannister, K & Johnson, D: Streptococcal peritonitis in Australian peritoneal dialysis patients: predictors, treatment and outcomes in 287 cases. *BMC Nephrology*, 10**:** 19, 2009.

6. McDonald, SP, Marshall, MR, Johnson, DW & Polkinghorne, KR: Relationship between Dialysis Modality and Mortality. *J Am Soc Nephrol*, 20**:** 155-163, 2009.

7. Macdonald, JA, McDonald, SP, Hawley, CM, Rosman, J, Brown, F, Wiggins, KJ, Bannister, K & Johnson, DW: Recovery of renal function in end-stage renal failure--comparison between peritoneal dialysis and haemodialysis. *Nephrol Dial Transplant.***:** Advance Access published on May 14, 2009, DOI 10.1093/ndt/gfp216, 2009.

8. Levidiotis, V, Chang, S & McDonald, S: Pregnancy and Maternal Outcomes Among Kidney Transplant Recipients. *J Am Soc Nephrol***:** ASN.2008121241, 2009.

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10. Johnson, DW, Dent, H, Hawley, CM, McDonald, SP, Rosman, JB, Brown, FG, Bannister, KM & Wiggins, KJ: Associations of dialysis modality and infectious mortality in incident dialysis patients in Australia and New Zealand. *Am J Kidney Dis*, 53**:** 290-7, 2009.

11. Irving, MJ, Johnson, DW, McDonald, S, Walker, RG, Frommer, MS & Craig, JC: Opinions on the Content and Effects of Clinical Practice Guidelines for CKD: A Survey of Nephrologists in Australia and New Zealand. *Am J Kidney Dis*, 53**:** 1082-90, 2009.

12. Howard, K, White, S, Salkeld, G, McDonald, S, Craig, J, Chadban, S & Cass, A: Cost-effectiveness of screening and optimal management for diabetes, hypertension and chronic kidney disease to prevent end-stage kidney disease: a modelled analysis. *Value in Health* In Press, 2009.

13. Howard, K, Salkeld, G, White, S, McDonald, S, Chadban, S, Craig, JC & Cass, A: The cost-effectiveness of increasing kidney transplantation and home-based dialysis. *Nephrology*, 14**:** 123-132, 2009.

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15. Collins, MG, Chang, SH, Russ, GR & McDonald, SP: Outcomes of transplantation using kidneys from donors meeting expanded criteria in Australia and New Zealand, 1991 to 2005. *Transplantation*, 87**:** 1201-9, 2009.

16. Barraclough, K, Hawley, CM, McDonald, SP, Brown, FG, Rosman, JB, Wiggins, KJ, Bannister, KM & Johnson, DW: Corynebacterium peritonitis in Australian peritoneal dialysis patients: predictors, treatment and outcomes in 82 cases. *Nephrol. Dial. Transplant.***:** gfp322, 2009.

17. Orr, NI, McDonald, SP, McTaggart, S, Henning, P & Craig, JC: Frequency, etiology and treatment of childhood end-stage kidney disease in Australia and New Zealand. *Pediatr Nephrol*, 24**:** 1719-26, 2009.

18. Johnson DW, Dent H, Yao Q, Tranaeus A, Huang CC, Han DS et al.
Frequencies of hepatitis B and C infections among haemodialysis and peritoneal dialysis patients in Asia-Pacific countries: analysis of registry data.
Nephrol Dial Transplant. 2009 May; 24(5): 1598-603. (Epub 2008 Dec 18 doi:10.1093/ndt/gfn684)

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Associations of Dialysis Modality and Cardiovascular Mortality in Incident Dialysis Patients.
Clin J Am Soc Nephrol (Epub 2009 Sep 3 doi: 10.2215/CJN.01750309)

(2009 Publications continued next page)

2009 **(Continued)**

20. Webster AC, Supramaniam R, Connell DL, Chapman JR, Craig JC. Validity of registry data: agreement between cancer records in an end stage kidney disease registry (voluntary reporting) and a cancer register (statutory reporting). Nephrology 2009 *(in press).*

21. van Leeuwen MT, Webster AC, McCredie MRE, Stewart JH, McDonald SP, Amin J, Kaldor JM, Chapman JR, Vadjic CM, Grulich AE. Reduction of immunosuppression after kidney transplant failure is associated with decreased risk of some cancer types. *BMJ 2009 (in press).*

22. Vajdic CM, van Leeuwen MT, Webster AC, McCredie MRE, Stewart JH, Chapman JR, Amin J, McDonald SP, Grulich AE. Cutaneous Melanoma is Related to Immune Suppression in Kidney Transplant Recipients. *Cancer Epidemiology, Biomarkers and Prevention 2009;* 18:2297-2303.

23. van Leewen MT, Grulich AE, Webster AC, McCredie MRE, Stewart JH, McDonald SP, Amin J, Kaldor JM, Chapman JR, Vadjic CM. Immunosuppression and other risk factors for early and late non-Hodgkin lymphoma after kidney Transplantation. *Blood* 2009; 114(3):630-7.

24. van Leewen MT, Grulich AE, McDonald SP, McCredie MRE, Amin J, Stewart JH, Webster AC, Chapman JR, Vajdic CM. Immunosuppression and other risk factors for lip cancer after kidney transplantation. *Cancer Epidemiology, Biomarkers and Prevention* 2009 18(2):561-569.

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27. Nesrallah GE, Suri RS, Moist LM, Cuerden M, Groeneweg KE, Hakim R, Ofsthun NJ, McDonald SP, Hawley C, Caskey FJ, Couchoud C, Awaraji C, Lindsay RM. International Quotidian Registry: annual report 2009. Hemodial Int. 2009 Jul: 13(3): 240-9.

28. Lim WH, Chang S, Chadban S, Campbell S, Dent H, Russ GR, McDonald SP. Interleukin-2 Receptor Antibody Reduces Rejection Rates and Graft Loss in Live Donor Kidney Transplant Recipients. Transplantation 2009 - in press.

29. Lim, WH, Russ GR, McDonald SP. Comparable transplant outcomes between local and shipped deceased donor kidneys in Australia: analysis of ANZDATA Registry 1992-2007. Nephrology 2009 - in press.

30. Miles R, Hawley CM, McDonald SP, Brown FG, Rosman JB, Wiggins KJ, Bannister KM, Johnson DW. Predictors and Outcomes of fungal peritonitis in peritoneal dialysis patients. Kidney International 2009 Sep: 76 (6): 622-8. E Pub 2009 Jun 10.

31. Macdonald JA, McDonald SP, Hawley CM, Rosman JB, Brown FG, Wiggins KJ, Bannister KM, Johnson DW. Recovery of renal function in end-stage renal failure - comparison between peritoneal dialysis and haemodialysis. Nephrol Dial Transplant 2009 Sept: 24(9): 2825-31. Epub 2009 May 14.

32. Johnson DW, Dent H, Hawley CM, McDonald SP, Rosman JB, Brown FG, Bannister KM, Wiggins KJ. Associations of dialysis modality and infectious mortality in incident dialysis patients in Australia and New Zealand. Am J Kid Disease 2009 Feb: 53(2): 290-7. Epub 2008 Sept 21

Publications in peer-reviewed journals based substantially on data from ANZDATA and released during 2010 are listed below.

2010

1 Barraclough K, Hawley CM, McDonald SP, Brown FG, Rosman JB, Wiggins KJ, *et al.* Polymicrobial peritonitis in peritoneal dialysis patients in Australia: predictors, treatment, and outcomes. *Am J Kidney Dis*. 2010; **55**: 121-31.

2 Bordador E, Johnson D, Henning P, Kennedy S, McDonald S, Burke J, *et al.* Epidemiology and outcomes of peritonitis in children on peritoneal dialysis in Australasia. *Pediatric Nephrology*. 2010; **25**: 1739-45.

3 Fahim M, Hawley CM, McDonald SP, Brown FG, Rosman JB, Wiggins KJ, *et al.* Culture-Negative Peritonitis in Peritoneal Dialysis Patients in Australia: Predictors, Treatment, and Outcomes in 435 Cases. *Am J Kidney Dis*. 2010; **55**: 690-7.

4 Jarvis EM, Hawley CM, McDonald SP, Brown FG, Rosman JB, Wiggins KJ, *et al.* Predictors, treatment, and outcomes of non-Pseudomonas Gram-negative peritonitis. *Kidney Int*. 2010; **78**: 408-14.

5 Lim WH, Russ GR, McDonald SP. Comparable transplant outcomes between local and shipped deceased-donor kidneys in Australia: analysis of Australia and New Zealand Dialysis and Transplant Registry 1992-2007. *Nephrology (Carlton)*. 2010; **15**: 124-32.

6 McDonald S. Incidence and treatment of ESRD among indigenous peoples of Australasia. *Clin Nephrol*. 2010; **74** Suppl 1: S28-31.

7 Webster AC, Supramaniam R, O'Connell DL, Chapman JR, Craig JC. Validity of registry data: agreement between cancer records in an end-stage kidney disease registry (voluntary reporting) and a cancer register (statutory reporting). *Nephrology (Carlton)*. 2010; **15**: 491-501.

8 Edey M, Hawley CM, McDonald SP, Brown FG, Rosman JB, Wiggins KJ, *et al.* Enterococcal peritonitis in Australian peritoneal dialysis patients: predictors, treatment and outcomes in 116 cases. *Nephrol Dial Transplant*. 2010; **25**: 1272-8.

9 Fahim M, Hawley CM, McDonald SP, Brown FG, Rosman JB, Wiggins KJ, *et al.* Coagulase-negative staphylococcal peritonitis in Australian peritoneal dialysis patients: predictors, treatment and outcomes in 936 cases. *Nephrol Dial Transplant*. 2010; **25**: 3386-92.

10 Govindarajulu S, Hawley CM, McDonald SP, Brown F, Rosman J, Wiggins KJ, *et al.* Staphylococcus Aureus Peritonitis in Australian Peritoneal Dialysis Patients: Predictors, Treatment, and Outcomes in 503 Cases. *Perit Dial Int*. 2010; **30**: 311-9.

11 Johnson DW, Cho Y, Livingston BE, Hawley CM, McDonald SP, Brown FG, *et al.* Encapsulating peritoneal sclerosis: incidence, predictors, and outcomes. *Kidney Int*. 2010; **77**: 904-12.

12 Johnson DW, Hawley CM, McDonald SP, Brown FG, Rosman JB, Wiggins KJ, *et al.* Superior survival of high transporters treated with automated versus continuous ambulatory peritoneal dialysis. *Nephrol Dial Transplant*. 2010; **25**: 1973-9.

13 Lim WH, Chadban SJ, Campbell S, Dent H, Russ GR, McDonald SP. Interleukin-2 receptor antibody does not reduce rejection risk in low immunological risk or tacrolimus-treated intermediate immunological risk renal transplant recipients. *Nephrology (Carlton)*. 2010; **15**: 368-76.

14 Lim WH, Chang S, Chadban S, Campbell S, Dent H, Russ GR, *et al.* Donor-recipient age matching improves years of graft function in deceased-donor kidney transplantation. *Nephrol Dial Transplant*. 2010; **25**: 3082-9.

15 Marley JV, Dent HK, Wearne M, Fitzclarence C, Nelson C, Siu K, *et al.* Haemodialysis outcomes of Aboriginal and Torres Strait Islander patients of remote Kimberley region origin. *Med J Aust*. 2010; **193**: 516-20.

16 Brook NR, Gibbons N, Nicol DL, McDonald SP. Open and laparoscopic donor nephrectomy: activity and outcomes from all Australasian transplant centers. *Transplantation*. 2010; **89**: 1482-8.

17 Pilmore H, Dent H, Chang S, McDonald SP, Chadban SJ. Reduction in cardiovascular death after kidney transplantation. *Transplantation*. 2010; **89**: 851-7.

18 Scott DR, Wong JK, Spicer TS, Dent H, Mensah FK, McDonald S, *et al.* Adverse impact of hepatitis C virus infection on renal replacement therapy and renal transplant patients in Australia and New Zealand. *Transplantation*. 2010; **90**: 1165-71.

19 van Leeuwen MT, Webster AC, McCredie MRE, Stewart JH, McDonald SP, Amin J, *et al.* Effect of reduced immunosuppression after kidney transplant failure on risk of cancer: population based retrospective cohort study. *BMJ*. 2010; **340**: c570-.

2007

AUST. & N.Z. DIALYSIS AND TRANSPLANT SURVEY

THIS SECTION FOR ALL PATIENTS

REGISTRY NUMBER | 1 INITIAL HOSPITAL: Hospital/State, Hosp. Unit No. | CURRENT PARENT HOSPITAL: Hospital/State, Hosp. Unit No | Physician (Optional)

2 Surname, Given Names | 3 DATE OF BIRTH | 4 SEX

5 RACIAL ORIGIN (Record from list) | OTHER

6 PRIMARY RENAL DISEASE (Record from list) | OTHER

7 BIOPSY Y/N

8 SE. CREATININE AT ENTRY

9 COUNTRY OF BIRTH (If Australia or NZ - Tick box) | AUST | NZ | OTHER COUNTRY (Please specify)

10 POSTCODE At Entry

POSTCODE At End Survey

11 CO-MORBID CONDITIONS AT ENTRY

LATE REFERRAL (<3 MTHS BEFORE FIRST TREATMENT) (Y/N)

HEIGHT (cms)

WEIGHT (kg)

CIGARETTE SMOKING — N=Never, F=Former, C=Current

Kidney Health Australia

DISEASE AT ENTRY AND DURING CURRENT SURVEY

Y=Yes N=No S=Suspected

DIABETES N=No, O=Type 1 Insulin dependent, P=Type 2 Non Insulin requiring, Q=Type 2 Insulin requiring

	CHRONIC LUNG Y/S/N	CORONARY ARTERY Y/S/N	PERIPHERAL VASCULAR Y/S/N	CEREBRO VASCULAR Y/S/N	DIABETES
AT ENTRY					
LAST					
CURRENT					

OTHER CO-MORBID CONDITIONS (Write In)

AT ENTRY	
PREVIOUS ENTRIES	
CURRENT	

12 CENTRE OF TREATMENT

Enter geographical location at Death or End of Survey

	HOSPITAL / CENTRE NAME (Write In or Tick if same)	CENTRE CODE	DATE TRANSFER
CURRENT			
LAST			

13 COURSE OF TREATMENT

COMPLETE ACCORDING TO CODE

REASON FOR DIALYSIS MODALITY CHANGE from CAPD to APD / APD to CAPD / Any PD to HD / HD to any PD
Enter Reason for Change FROM Previous Modality TO Current Modality
Refer to codes on back of form

A APD / IPD Hospital
C APD / IPD Satellite
E APD / IPD Home
L CAPD Hosp/Outpatient
M CAPD Home
B HD Hospital
D HD Satellite
F HD Home
G Transplant in AUST/NZ
H Date of last post graft dialysis
X Transplant Overseas
I Graft function Temporary/Permanently ceased (Date return to dialysis)
J Own kidney function recovered. Dialysis ceased
K Date of last visit if lost to follow up
Z DATE OF DEATH

SEQ. No.	CODE	DAY	MTH	YR	REASON
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14 HEPATITIS C ANTIBODY

1=Positive 2=Negative 3=Not done | CURRENT | LAST

15 CANCER EVER? Y/N — If Yes, please complete Cancer Form

16 CAUSE OF DEATH (Record from list) | OTHER

17 WAS GRAFT SUSTAINING LIFE? — Without dialysis at time of death Y=Yes N=No

18 PARENTHOOD

HAS THIS PATIENT BECOME PREGNANT OR FATHERED A CHILD DURING THIS SURVEY — Y=Yes N=No

If Yes, please complete a Parenthood Outcome form

DATE OF LAST OUTCOME

THIS SECTION FOR ALL PATIENTS DIALYSED AT ANY TIME DURING THE SURVEY PERIOD

19 TYPE OF DIALYSIS (See list)

20 DRY WEIGHT AT LAST DIALYSIS kg (HD and PD Patients)

21 UNCORRECTED CALCIUM mmol/l (See instructions on the back of the form)

22 PHOSPHATE mmol/l

23 HAEMOGLOBIN g/l Last Available

24 EPO AGENT Y=Yes N=No

25 FERRITIN ug/l Within last 3 mths of Survey or record not done

26 % SATURATION IRON (Transferrin Saturation)

HAEMODIALYSIS

27 DIALYSER BRAND (Write In) | CODE | BRAND NAME AND MODEL

28 BLOOD FLOW RATE Pump Speed (mls/min)

29 SESSIONS PER WEEK

30 HOURS PER SESSION

31 UREA REDUCTION or Kt/V | Method (See List) | Value

32 ACCESS IN USE (Functioning only) Enter for ALL PATIENTS ON HAEMODIALYSIS AT ANY TIME DURING THIS SURVEY PERIOD

AT FIRST HD / AT LAST HD: 1=Native, 2=Synthetic, 3=Tunnel CV Catheter, 4=Non Tunnel CV Catheter

FOR FISTULAS AND GRAFTS ONLY
DECLOTTED during Survey: Y=Yes N=No D=Declotted and revised
REVISED during Survey: N=No S=Surgical A=Angioplasty B=Both

IN THE EVENT OF THE PATIENT HAVING BOTH HD AND PD, AND A TRANSPLANT DURING THE SURVEY COMPLETE SECTIONS 19-41 INCLUSIVE

ALL PERITONEAL DIALYSIS

33 PET TEST (Once Only) Within first 6 mths (Dx / Plasma Creatinine at 4 hours)

34 CONNECTION SYSTEM | CODE | (Write In)

35 PERITONITIS DATE OF FIRST EPISODE

36 NUMBER OF EPISODES OF PERITONITIS During this Survey

37 TOTAL VOLUME OF WEEKLY CHANGES (Litres/week)

38 CREATININE CLEARANCE Dialysate ONLY — Adjusted for Body Surface Area (Litres/week/1.73 m²) Range 10-200 Litres/Week

39 WEEKLY Kt/V Dialysate ONLY (Range 0.1 - 5.0)

40 RESIDUAL RENAL FUNCTION (Creatinine Clearance) — Adjusted for Body Surface Area (Litres/week/1.73 m²)

41 PD SOLUTIONS - Y=Yes N=No (Please fill in all boxes) — Glucose, Icodextrin, Low GDP Lactate, Low GDP Bicarbonate, OTHER

CURRENT GRAFT (IN THE EVENT OF BOTH GRAFT FAILURE AND RETRANSPLANT IN THIS SURVEY - USE A NEW FORM)

42 GRAFT NUMBER

43 DATE OF THIS TRANSPLANT

44 REFERRING HOSPITAL

45 DONOR HOSPITAL

46 TRANSPLANT HOSPITAL

47 RECIPIENT ANTIBODY STATUS AT GRAFT — CMV, EBV: 1=Positive 2=Negative 3=Not done

48 NUMBER REJECTION EPISODES THIS SURVEY (Complete acute rejection form for each episode) (at any time)

49 DONOR DETAILS | SOURCE | AGE | SEX (See list)

50 TOTAL ISCHAEMIA (Hours)

51 IMMEDIATE FUNCTION (See list)

52 DISEASE IN GRAFT If Yes (See list)

53 DATE FIRST PROVEN (eg. Graft biopsy)

54 CAUSE OF GRAFT FAILURE | OTHER (Record from list)

55 MONOCLONAL / POLYCLONAL THERAPY (Record from list)

COURSE	DATE	AGENT	OTHER	NUMBER OF DOSES GIVEN	REASON	OTHER
1st						
2nd						
3rd						

56 TOTAL DAILY DRUG DOSE (mg)

	TOTAL INITIAL ORAL DOSE	1 MTH	2 MTH	3 MTH	6 MTH	1 YR	2 YR	3 YR	5 YR	7 YR	10 YR	15 YR	20 YR	25 YR	30 YR	35 YR
CYA																
AZA																
PRED																
TACROL																
MMF																
SIROL																
OTHER																

57 CYA SPARING DRUG 0=NOT GIVEN 1=GIVEN (eg DILTIAZEM - KETOCONAZOLE - VERAPAMIL)

58 BODY WEIGHT (kg)

59 SERUM CREATININE µmol/L

FOR OFFICE USE ONLY

60 HLA TYPING

	BLOOD GROUP	A		B		DR		DQ	
RECIPIENT									
DONOR									

62 PRA AND CROSSMATCH

MAXIMUM	CURRENT

ANZDATA Registry 2010 Report

DATA COLLECTION FORM

INSTRUCTIONS FOR DIALYSIS AND TRANSPLANTATION SURVEY COMPILATION
PLEASE READ THE EXPLANATORY NOTES BEFORE COMMENCING TO FILL IN THE FORMS
Please complete the form using neat capitals

5 – RACIAL ORIGIN
1 Caucasoid
2 Australian Aborigine
3 Chinese
4 Maori
5 Arab
61 Cook Islander
63 Samoan
64 Tongan
65 Torres Strait Islander
69 Pacific People – other (**specify**)
7 Indian
8 Indonesian
9 Malay
10 Filipino
11 Vietnamese
20 Other (**specify**)
00 Patient objects to answering question

Mixed race coded by patient's assessment

6 - PRIMARY RENAL DISEASE
Results of ANCA (Anti Neutrophil Cytoplasmic Antibody) test in association with glomerulonephritis should be entered in box marked OTHER

100 Presumed GN, type undefined histologically (no biopsy)
110 Focal sclerosing GN (including hyalinosis)
111 Primary focal sclerosing GN or focal glomerular sclerosis
112 Secondary focal sclerosing GN
121 Mesangiocapillary GN with subendothelial deposits (double contour)
122 Mesangiocapillary GN with intramembranous deposits (dense deposit disease)
130 Membranous GN
140 Extra and intra capillary GN (extensive crescents - clinically rapidly progressive)
151 Mesangial proliferative (IgA+ positive)
152 Mesangial proliferative (IgA- negative)
153 Mesangial proliferative (no I.F. studies)
160 Focal and segmental proliferative GN (including focal necrotising)
170 Advanced GN (unclassified = end stage)
180 GN with systemic disease (**specify**)
181 Goodpasture's syndrome with linear IgG and lung haemorrhage
182 Proliferative GN with linear IgG -no lung haemorrhage
183 SLE
184 Henoch-Schonlein purpura
185 Wegener's Granulomatosis
186 Microscopic Polyarteritis
187 Scleroderma
190 GN other (**specify**)
191 Familial GN (**specify Alport's - yes** or **no**)
200 Analgesic nephropathy
300 Renal vascular disease due to malignant hypertension (NO primary renal disease)
301 Renal vascular disease – type unspecified
302 Renal vascular disease – due to hypertension (nephrosclerosis) (NO primary renal disease)
303 Atheroembolic disease (cholesterol emboli)
304 Bilateral renal artery stenosis
400 Polycystic kidney disease
401 Medullary cystic disease
402 Infantile/juvenile polycystic kidney disease
500 Reflux nephropathy
600 Pyelonephritis
700 Calculi
701 Gout
801 Diabetes – Type 1 (insulin dependent) **[Juvenile onset]**
802 Diabetes – Type 2 (non-insulin requiring)
803 Diabetes – Type 2 (insulin requiring) **[Mature onset]**
000 Other (**specify**)
001 Uncertain diagnosis
002 Lead nephropathy
003 Cadmium toxicity
004 Renal tuberculosis
005 Amyloid disease
006 Haemolytic uraemic syndrome
007 Cortical necrosis
008 Interstitial nephritis
009 Congenital renal hypoplasia and dysplasia
010 Loss of single kidney (**specify - e.g. trauma, surgery**)
011 Megaureter
012 Oxalosis
013 Cystinosis
014 Balkan nephropathy
015 Renal cell carcinoma (GRAWITZ)
016 Transitional cell carcinoma of urinary tract
017 Paraproteinaemia (including multiple myeloma)

PRIMARY RENAL DISEASE cont.
018 Light chain nephropathy (benign)
019 Lithium toxicity
020 Post partum nephropathy
021 Sarcoidosis
031 Posterior urethral valves
032 Pelvi-ureteric junction obstruction
033 Obstructed megaureter
034 Neuropathic bladder
035 Non-obstructed dilated bladder and ureters (megacystitis – megaureter)
036 Spina bifida or myelomeningocoele
037 Bladder neck obstruction (incl. prostatomegaly)
039 Other lower urinary tract abnormalities (with secondary reflux) (**specify**)
040 Ureteric obstructive nephropathy
041 Obstructive nephropathy

13 – REASON FOR MODALITY CHANGE
From CAPD to APD
From APD to CAPD
From any form of PD to HD
From HD to any form of PD

10 Recurrent / persistent peritonitis
11 Acute peritonitis
15 Tunnel / exit site infection
16 Diverticulitis
20 Inadequate solute clearance
21 Inadequate fluid ultrafiltration
22 Excessive fluid ultrafiltration
27 Abdominal abscess
30 Dialysate leak
31 Catheter block
32 Haemoperitoneum
33 Catheter fell out
35 Hernia
36 Abdominal pain
40 Abdominal surgery
41 Sclerosing peritonitis
42 Peritoneal infection
43 Multiple adhesions
44 Pregnancy
45 Haematuria
46 Pleural effusion
47 Cardiovascular instability
48 Geography – poor access to dialysis services
49 Vascular access problems
50 Patient preference
51 Unable to manage self-care
60 Recovery of renal function
70 Transplantation
80 Death
81 Transfer outside Australia or New Zealand
82 Other surgery
83 Hydrothorax
85 Poor nutrition
86 Scrotal oedema
90 Planned transfer after acute PD start
91 Planned transfer after acute HD start
99 Other (**specify**)

16 - CAUSE OF DEATH
CARDIAC
10 Myocardial ischaemia (presumed)
11 Myocardial ischaemia and infarction
12 Pulmonary oedema
13 Hyperkalaemia
14 Haemorrhagic pericarditis
15 Hypertensive cardiac failure
16 Cardiac arrest – cause uncertain
17 Other causes of cardiac failure (**specify**)

VASCULAR
21 Pulmonary embolus
22 Cerebrovascular accident
23 Gastrointestinal haemorrhage
24 Haemorrhage from dialysis access site
25 Haemorrhage from transplant artery
26 Aortic aneurysm – rupture
27 Haemorrhage from elsewhere (**specify**)
28 Bowel infarction

INFECTION
Please enter code for nature of infective organism, after the code for site of infection Please **specify type of organism**
eg Staph, CMV, Candida, etc

eg 321 Lung infection – bacterial (staph)
322 Lung infection – viral (CMV)

31 CNS
32 Lung
33 Urinary tract
34 Wound
35 Shunt
36 Peritoneum

1 Bacterial
2 Viral
3 Fungal
4 Protozoa
5 Other

CAUSE OF DEATH cont.
37 Septicaemia – site unknown (**specify organism**)
38 Liver (incl. viral hepatitis) (**specify** A, B, CMV, herpes, etc)
39 Other site (**specify**)

SOCIAL
40 Withdrawal for psycho-social reasons
41 Patient refused further treatment (**specify reason**)
42 Suicide
43 Therapy ceased for any other reason (**specify reason**)
44 Accidental death (**specify**)
45 Withdrawal for cardiovascular comorbid conditions
46 Withdrawal for cerebrovascular comorbid conditions
47 Withdrawal for peripheral vascular comorbid conditions
48 Withdrawal related to malignancy
49 Withdrawal related to dialysis access difficulties (AVF, Tenckhoff, etc)

MISCELLANEOUS
50 Hepatic failure (**specify**)
51 Uraemia caused by graft failure
52 Pancreatitis
53 Bone marrow depression
54 Cachexia
55 Unknown
56 Malignant disease
57 Perforation of abdominal viscus – peptic ulcer, diverticulum, appendix
58 Dialysis dementia (aluminium)
59 Other (**specify**)
60 Immunodeficiency due to viral infection (**specify organisms involved**)
61 Chronic respiratory failure
62 Sclerosing peritonitis

19 – TYPE OF DIALYSIS
11 Haemodialysis – plate dialysers
12 Haemodialysis – hollow fibre dialysers
15 Haemofiltration
16 Haemodiafiltration
19 C.V.V.HD (Intensive Care Unit)
20 Peritoneal – bags no cycler
21 Peritoneal – continuous ambulatory (CAPD)
22 Peritoneal – automated (APD)
23 Peritoneal – intermittent cycler (IPD)
25 Peritoneal – other (**specify**)

20 – DRY WEIGHT
At end of survey, transplantation or death.

21 – UNCORRECTED CALCIUM
Not corrected for albumin
Midweek, predialysis and closest to end of survey, transplantation or death.

22 – PHOSPHATE
Midweek, predialysis and closest to end of survey, transplantation or death.

23 – HAEMOGLOBIN
Midweek, predialysis and closest to end of survey, transplantation or death.

31 – URR or Kt/V **Please enter method used**
A Urea Reduction Ratio % (URR%)
B Kt/V (by BIOSTAT)
C Kt/V (by UKM)
D Kt/V (by DAUGIRDAS – single pool)
E Kt/V (other method – **specify**)

Kt/V (for HD patients) Range 0.5 – 2.2

UREA REDUCTION RATIO %
$$\left(\frac{\text{Pre dialysis urea} - \text{post dialysis urea}}{\text{Pre dialysis urea}}\right) \times 100 = \textbf{URR\%}$$

Pre dialysis urea:
Blood should be drawn from the 'arterial' needle immediately prior to dialysis, at a mid-week dialysis session

Post dialysis urea:
Blood is again drawn from the 'arterial' needle and this should occur **within 20 seconds** after cessation of the blood pump (alternatively the pump can be turned down to 50 ml/min) – this is to avoid problems with recirculation

32 – ACCESS IN USE
Type at First HD - leave blank if initial renal replacement treatment was not haemodialysis.

Type at Last HD - enter for all patients on haemodialysis at any time during the survey. Enter the procedure closest to the end of survey, change to PD, transplantation, or death.

33 – PET TEST (Required **Once Only** per patient)
Standard Peritoneal Dialysis Equilibration Test
performed 1-6 months after initiation of PD
(2.5% 2 litre exchanges)

Provide dialysis/plasma creatinine at 4 hours
Range 0.1 – 1.2

38 to 40 – PD CLEARANCE STUDIES
Generated from a 24 hour collection of PD effluent and urine

NOTE: Dialysate Creatinine Clearance and Kt/V both refer to dialysis clearances ONLY (NOT the total of dialysis and renal clearances).

38 **CREATININE CLEARANCE (Dialysate only)**
Range 10 - 200 litres/week
Litres/week/1.73m^2 Body Surface Area

39 **WEEKLY Kt/V (Dialysate only) - Range** 0.1 – 5.0

40 **RESIDUAL RENAL FUNCTION (Creatinine Clearance)**
Litres/week/1.73m^2 Body Surface Area

49 – SOURCE OF DONOR KIDNEY
1 Deceased Donor
2 Sister (if twin, record 6 or 7)
3 Brother (if twin, record 6 or 7)
4 Mother
5 Father
6 Monozygotic (identical) twin
7 Dizygotic (non-identical) twin
8 Other related living donor (**specify**)
9 Son
10 Daughter
11 Husband
12 Wife
13 Cousin
14 Unrelated living donor (**specify**)

50 – TOTAL ISCHAEMIA (HOURS)
From time of donor renal artery interruption or aortic clamp, until time of release of renal artery in the recipient (clamp off)

51 – IMMEDIATE FUNCTION
1 Spontaneous fall in se.creatinine by 10% within 24 hours
2 Spontaneous fall in se.creatinine by 10%, first recorded between 25-72 hours
3 Poor immediate function. No spontaneous fall in se.creatinine within 72 hours; but no dialysis needed
4 No immediate function. No spontaneous fall (> 10%) in se.creatinine; dialysis required within 72 hours

52 – DISEASE IN GRAFT **Histologically proven**
Complete this section for **FUNCTIONING or FAILED GRAFTS**

Please enter **Date first proven (e.g. Graft Biopsy)**

B = BK virus nephropathy in graft
Y = Disease recurrence
– primary renal disease and disease in graft the same
D = De novo glomerulonephritis
– primary renal disease known and not the same
G = Glomerulonephritis in graft
– primary renal disease unknown or not biopsied

In cases of glomerulonephritis, where histological confirmation of recurrence may be uncertain, enter as G

54 – CAUSE OF GRAFT FAILURE
REJECTION
10 Hyperacute rejection (within 48 hours of transplantation)
20 Acute rejection at anytime, causing graft failure
40 Chronic allograft nephropathy (slow progressive loss of renal function, not due to recurrent original disease or acute rejection)

VASCULAR
50 Renal artery stenosis
51 Renal artery thrombosis
52 Renal vein thrombosis
53 Renal vessel haemorrhage (primary)
54 Renal vessel haemorrhage (secondary)
55 Embolus – thrombo
56 Embolus – cholesterol
57 Haemolytic uraemic syndrome

TECHNICAL
60 Non-viable kidney (due to pre-transplant cortical necrosis)
61 Cortical necrosis post transplant (not due to rejection)
70 Ureteric and bladder problems

GLOMERULONEPHRITIS
82 Mesangiocapillary GN with subendothelial deposits
83 Mesangiocapillary GN with intramembranous deposits (dense deposit disease)
84 Focal sclerosing GN (including hyalinosis)
85 Membranous GN
86 Mesangial proliferative GN (IgA positive)
87 Goodpasture's syndrome
88 Intra and extra capillary GN with extensive crescents (clinically rapidly progressive)
89 Other (**specify**)

DRUG THERAPY
90 Complications of drug therapy requiring reduction or withdrawal of steroid and/or immunosuppressants
91 Non-compliance with therapy – causing graft failure
92 Rejection following I/S reduction due to malignancy
93 Rejection following I/S reduction due to infection

MISCELLANEOUS
00 Other (**specify**)
01 Donor malignancy
02 Malignancy invading graft
05 BK virus nephropathy

55 – MONOCLONAL / POLYCLONAL THERAPY
Record in order of administration, each separate course of such drugs; a second course of the same drug should be separately recorded
Complete the requested details regarding, date, identity of drug, number of doses given, and reason for administration, according to the following codes

TYPE OF AGENT	NUMBER OF DOSES
2 Daclizumab (Zenepax)	
4 OKT3	
5 Intravenous Immunoglobulin	Record actual
6 Basiliximab (Simulect)	number of doses given
7 Rituximab	
8 Polyclonal anti T cell	
9 Other monoclonal (**specify**)	

REASON FOR USE
1 Prophylaxis
7 Treatment for acute rejection
8 Other (**specify**)

56 – TOTAL DAILY DRUG DOSE
Enter the total daily dose for each drug where applicable; if an unlisted drug is used, enter the name in the space provided marked **OTHER**

Only those drugs taken at the listed intervals should be entered; where necessary provide the dose recorded on the closest day preceding the requested time interval

The initial drug dose (at zero months) is **the first oral maintenance dose**; do **NOT** enter the intravenous loading doses administered at or shortly after transplantation

(2007)

SUMMARY

KEY SUMMARY POINTS

AUSTRALIA

- There were 18,243 people (834 per million population) receiving renal replacement therapy (RRT) at 31st December 2009. Of these, 7,902 (361 per million) had a functioning kidney transplant and 10,341 (473 per million) were receiving dialysis treatment.
- 2,337 people commenced RRT in Australia in 2009 (107 per million per year). The incidence rate varied from 320 per million population per year in the Northern Territory to 72 per million per year in the Australian Capital Territory (ACT).
- The mean age at commencement was 60.7 years, the median 63.4 years and the age range 3.5 months - 95.1 years.
- 33% of new patients had diabetic nephropathy attributed as their cause of end stage renal failure, 24% had glomerulonephritis and 14% hypertension.
- Of patients < 65 years of age and receiving dialysis treatment, 18% were on the active kidney transplantation waiting list at 31st December 2009. This proportion varied between <1% in the Northern Territory and 30% in the Australian Capital Territory (ACT). Only 4% of Aboriginal/Torres Strait Islander patients < 65 years were on the transplant waiting list.
- The mortality rate per 100 patient years was 15.3 for dialysis dependent patients and 1.20 for those with a functioning kidney transplant.
- Of the 1,525 deaths among dialysis dependent patients in 2009, 37% were due to withdrawal from treatment, 34% were due to cardiovascular causes, 12% to infection and 5% from malignancy.
- Of the 141 deaths among patients with kidney transplants, 27% were due to malignancy, 23% to cardiovascular causes and 20% to infection.
- There has been a 2% increase in the total number of prevalent dialysis patients from 10,135 in December 2008 to 10,341 in December 2009.
- There were 772 kidney transplant operations performed in 2009, (a transplant rate of 35 per million population). This was the second highest number ever of transplants performed; the highest being in 2008.
- Of these, 42% (326 grafts; 184 related and 142 non related) were from living donors, compared to 44% (354 grafts; 177 related and 177 non related) in 2008. 37% of primary live donor operations were performed without the recipient receiving prior dialysis therapy ("pre-emptive" transplants).
- For primary deceased donor grafts performed in 2008-2009, the 12 month patient and graft survival rates were 97% and 93% respectively.
- The five year primary deceased donor recipient and graft survival for operations performed in 2004-2005 were 89% and 80% respectively.
- In 2009, 1174 patients (11%) of Aboriginal/TSI ethnicity were dialysis dependent, 160 patients (2%) had a functioning transplant and 24 patients (3%) had a new transplant. There were 189 patients (8%) that commenced renal replacement therapy.
- The proportion of haemodialysis patients with a haemoglobin value >120 g/l has fallen consistently over the past three years (presumably in response to evidence about the adverse effects of higher Hb targets in some groups).
- There has been a steady decline in the proportion of people with serum phosphate >1.8 mmol/L over the last few years, with one third of patients reported values above this target.
- Among people receiving haemodialysis as their initial treatment modality, and referred to a nephrologist more than three months prior to starting dialysis, only 54% of people had a usable permanent access (AV fistula or graft) at the time of initial haemodialysis.

KEY SUMMARY POINTS

NEW ZEALAND

- There were 3,663 people (849 per million) receiving renal replacement therapy (RRT) at 31st December 2009. Of these, 1,403 (325 per million) had a functioning kidney transplant, and 2,260 (524 per million) were receiving dialysis treatment.
- 567 people (131 per million per year) commenced RRT in New Zealand in 2009.
- The mean age at commencement was 57.6 years, the median age 59.2 years and the age range 3.5 - 88.0 years.
- Diabetic nephropathy accounted for 47% of new patients, glomerulonephritis 22% and hypertension 11%.
- Of the incident diabetic patients, 22% (126 patients) were Maori, 12% (70 patients) were Pacific People, 7% (40 patients) were Caucasoid and 6% (31 patients) were of other ethnicity.
- Of patients < 65 years of age, 20% were on the active kidney transplantation waiting list at 31st December 2009. 21% of Maoris, 16% of Pacific People and 13% of Asians < 65 years of age were on the transplant waiting list.
- The mortality rate per 100 patient years was 18.8 for dialysis dependent patients and 1.36 for those with a functioning kidney transplant.
- Of the 331 deaths among dialysis dependent patients in 2009, 45% were due to cardiovascular causes, 25% to withdrawal from treatment, 14% to infection and 4% from malignancy.
- Of the 34 deaths among patients with a kidney transplant, 50% were due to malignancy,26% to cardiovascular causes and 9% due to infection.
- The number of patients who were dialysis dependent at 31st December 2009 (2,260) was an increase of 8% (2,102 patients) the previous year. 51% of all dialysis dependent patients were receiving home dialysis, of whom 68% were having peritoneal dialysis.
- There were 121 kidney transplant operations performed in 2009, a rate of 28 per million population.
- The percentage of live donors in 2009 was 55% (67 grafts), similar to 2008, 57% (69 grafts).
- For primary deceased donor grafts performed in 2008-2009, the 12 month patient and graft survival rates were 99% and 97% respectively.
- The five year primary deceased donor recipient and graft survival for operations performed in 2004-2005 were 91% and 87% respectively.
- The 1,403 functioning kidney transplants at 31st December 2009, a prevalence of 325 per million represents a 4% increase from 2008.
- Among people receiving haemodialysis as their initial treatment modality, and referred to a nephrologist more than three months prior to starting dialysis, only 40% of people had a usable permanent access (AV fistula or graft) at the time of first treatment.

PROLOGUE

Stephen McDonald

PROLOGUE
2009 REPORT

Each year in the "prologue' we try to highlight issues of interest.
In this report, we illustrate two areas

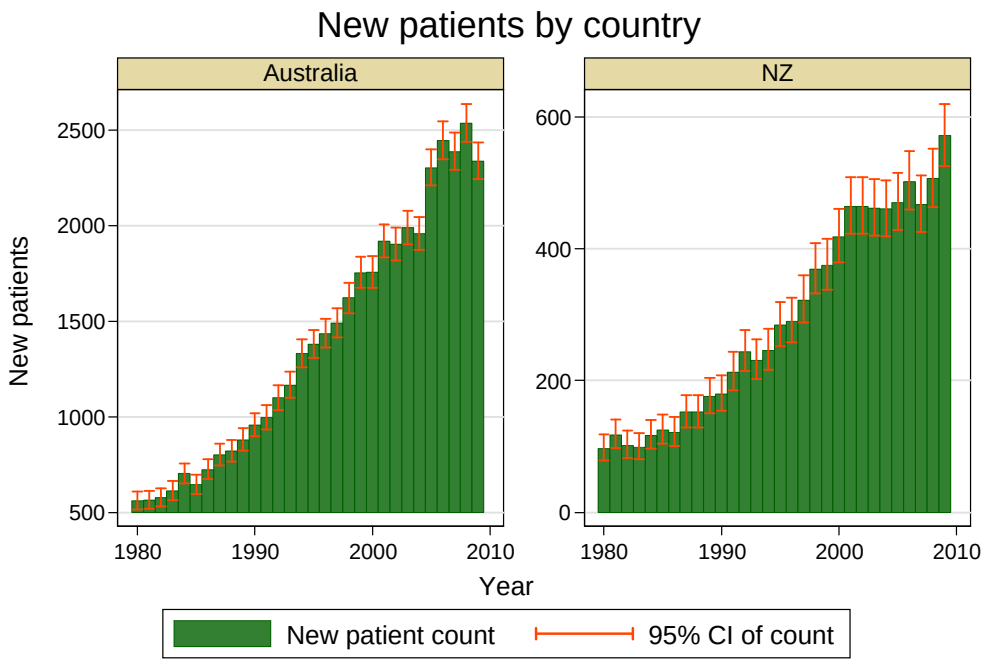
1) Recent trends in incidence rates
2) Variation in results between centres

INCIDENCE RATE TRENDS

There has been a progressive increase in incidence rates in both Australia and New Zealand. This has been primarily due to increases in rates among older people, in both Australia and New Zealand through to the mid 2000s. However, in the last few years there have been clear suggestions of a change in this trend, with apparent stabilisation of overall rates and the age-specific incidence rates in most groups. This is true for indigenous as well as non-indigenous people in both Australia and New Zealand. This stabilisation of incidence rates is similar to that observed some years ago in the USA, and has also been seen in the United Kingdom.

This is illustrated in Figure i for overall rates. However, overall interpretation of these trends is difficult - rates appeared to stabilise over the 1998-2000 period in Australia but then increased again, and the implications of the higher 2010 total in New Zealand are not yet clear.

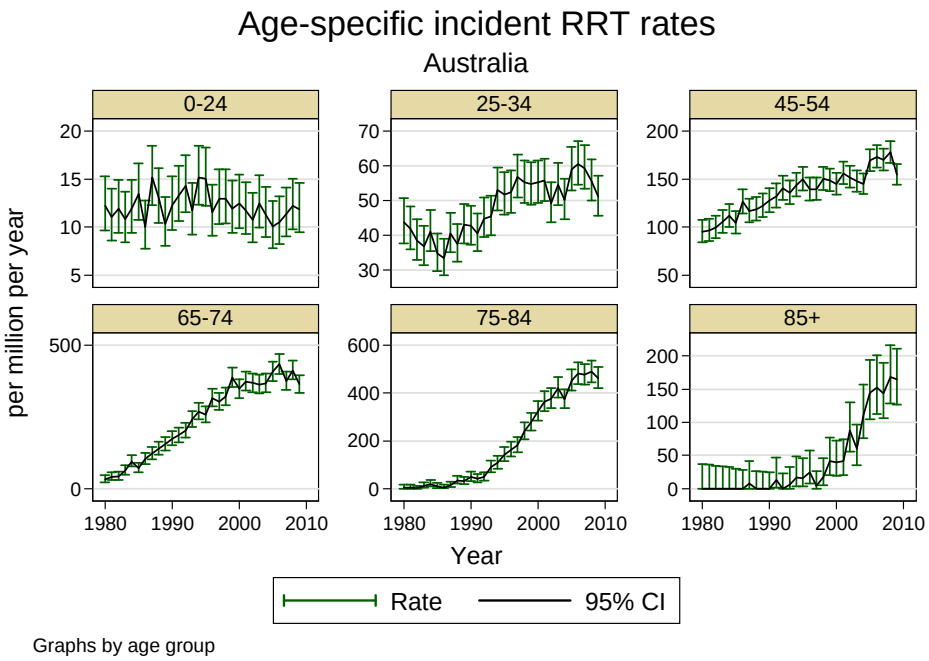
Figure i



ANZDATA Registry, incident RRT patients by country and year

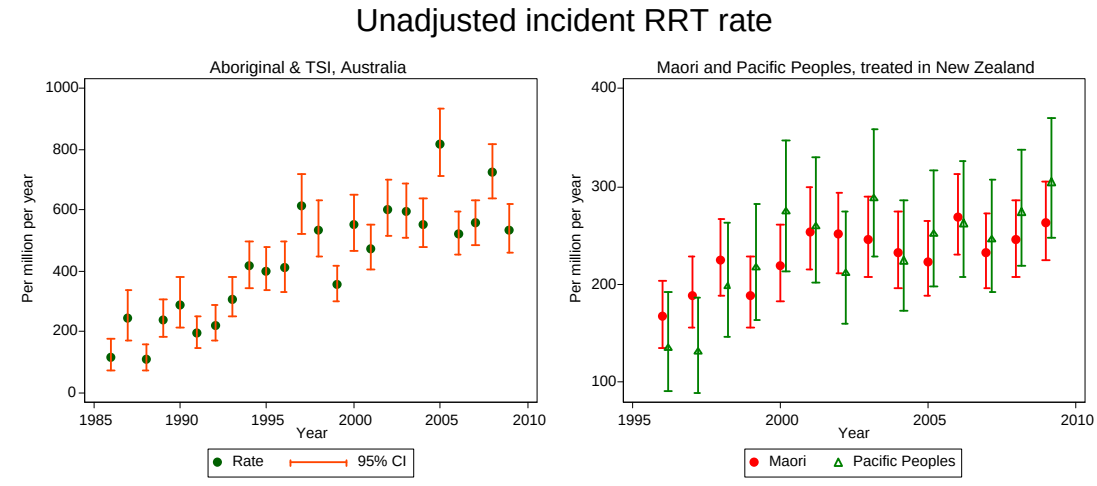
Figure ii illustrates age-specific Australian rates. Further information about the detailed incident numbers is available in the relevant chapters. Age specific rates for New Zealand are illustrated in Figure 2.3 in Chapter 2.

Figure ii



A similar trend towards "levelling off" can be seen in recent years among incident rates for indigenous people, both in Australia and New Zealand. Overall indigenous rates for Australian Aboriginal and New Zealand Maori and Pacific Peoples are shown in Figure iii. It should be noted that there are a number of other influences on indigenous rates; in particular they are subject to changes in the propensity of people in the population to identify themselves as indigenous. (This has been examined in some depth in Australia by the Australian Bureau of Statistics). Further information on indigenous incidence is contained in Chapter 12.

Figure iii

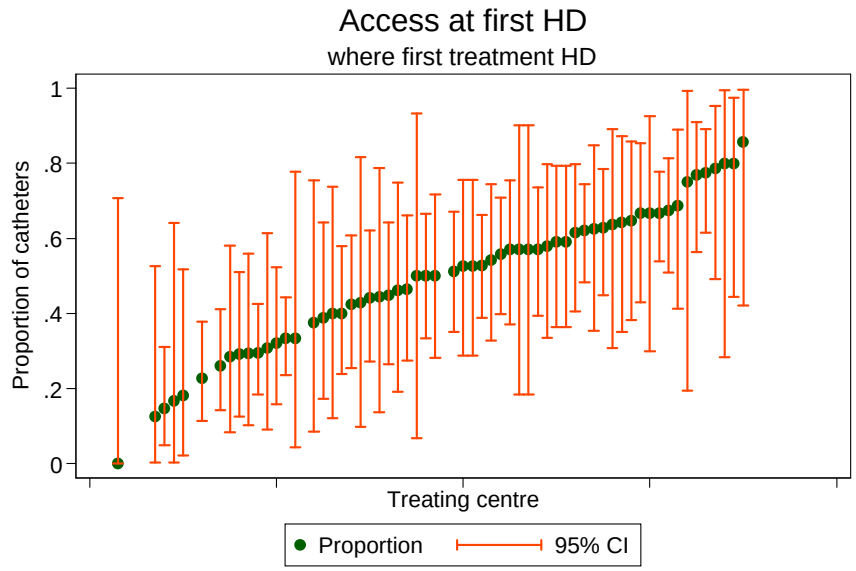


VARIATION IN RESULTS BETWEEN CENTRES

For some years, we have published graphs illustrating the variation in some parameters between units and between areas. Examples of this include peritonitis rate, phosphate level and (in the transplant arena) variation in waiting times for transplantation between States. Interest in this clinical variation is increasing, particularly from the quality assurance perspective. Over 2010-2011 ANZDATA, at the request of the Dialysis Nephrology and Transplantation Subcommittee of ANZSN and KHA, has developed enhanced reporting of Key Process Indicators for dialysis patients. This will be based around the "real-time" reporting system; beginning in 2011 contributing units will be provided (on a three monthly basis) with a report with dialysis KPI's. After considerable discussion, two KPI's will be reported initially - the number and rates of episodes of peritonitis among PD patients, and the rates of central venous catheter use at first haemodialysis (where this is the first renal replacement therapy).

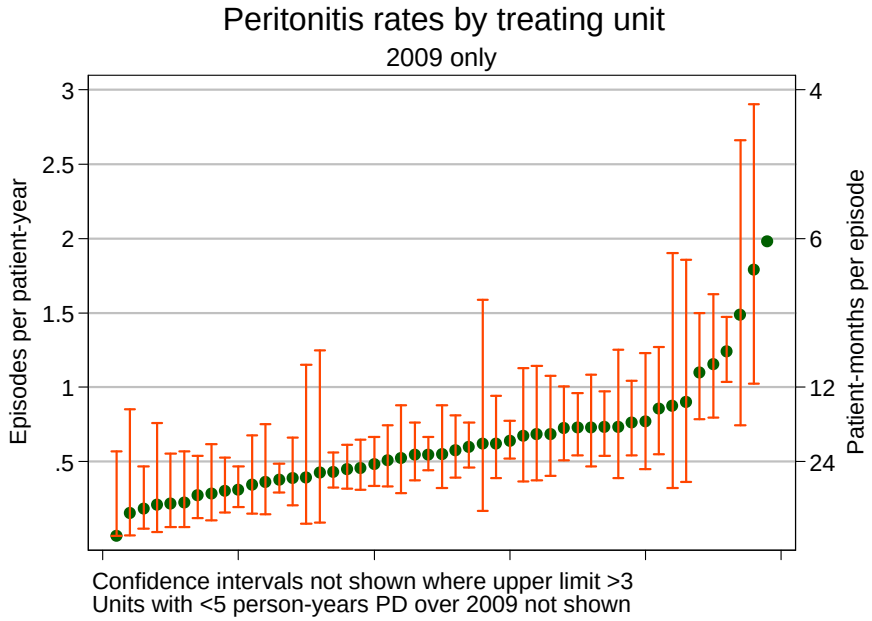
For both these parameters, there is considerable variation in rates between centres. For access at first haemodialysis, this might reflect variation in late referral. However, even after exclusion of these patients there is large variation in CVC use (Figure iv). Similar large variation is seen in peritonitis rate (Figure v).

Figure iv



ANZDATA, non-late referred new RRT 2009, HD at first treatment

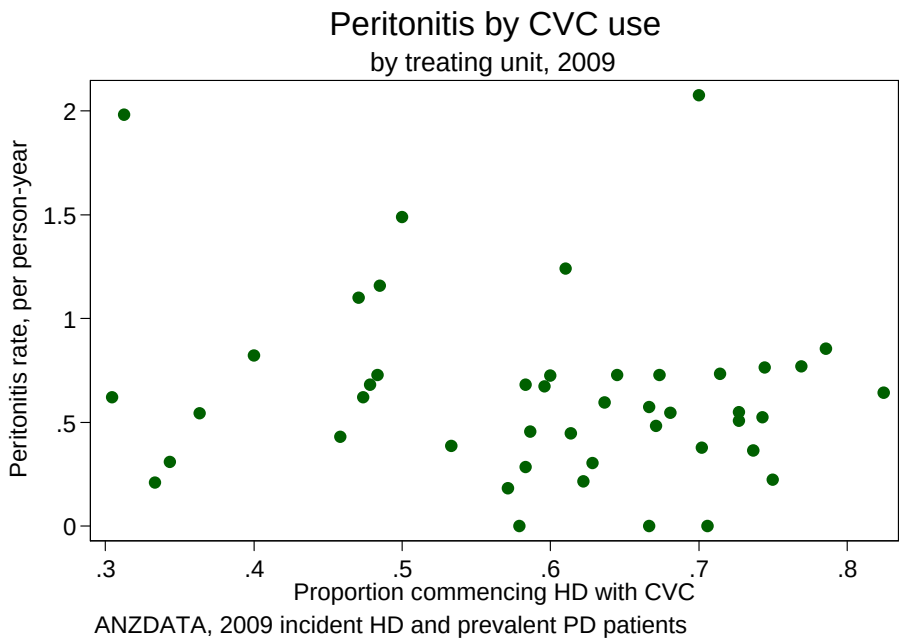
Figure v



Confidence intervals not shown where upper limit >3
Units with <5 person-years PD over 2009 not shown

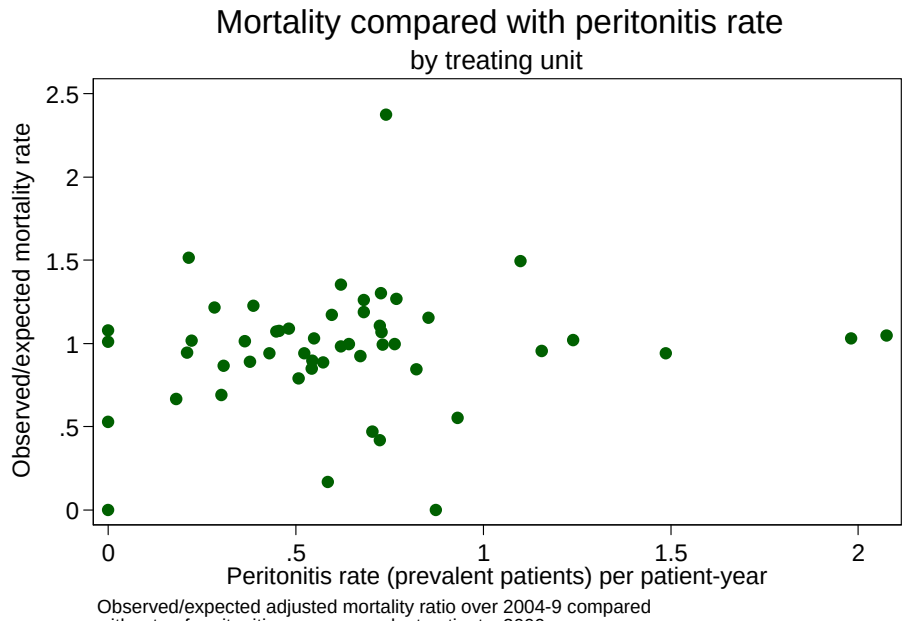
An obvious question which arises is how the various markers of "quality" relate to each other. In the case of use of central venous catheters and peritonitis rate (among transplant patients) there is little to suggest units that perform well on one marker also perform well on the other. This is illustrated in the scatter plot in Figure vi.

Figure vi



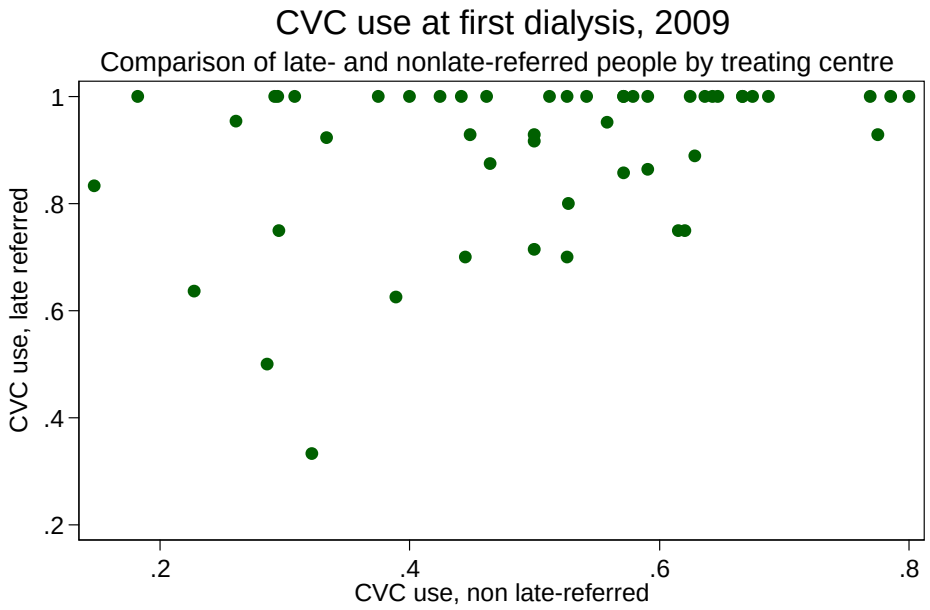
Similarly, there is no clear relationship between the observed peritonitis rates and the overall mortality for a given unit (across haemodialysis and peritoneal dialysis patients, adjusted for comorbidity). This is demonstrated in Figure vii, where the ratio of observed / expected mortality is compared with the observed peritonitis rates.

Figure vii



This lack of relationship extends to evaluation of different groups with the same marker. Although it is to be expected that overall rates of CVC use at the time of first dialysis will be much higher among patients referred late to nephrological care, it is reasonable to hypothesise that units which have low rates of CVC use among non-late referred patients might also have relatively lower rates among late-referred patients. This might reflect the underlying provision of access services etc. However, when the proportion of catheter use in each unit is compared between the two groups, it can be seen from Figure viii that there is only a modest relationship between these two measures.

Figure viii



ANZDATA, CVC use among incident HD patients where HD is the first RRT modality, >10 new patients in 2009

There are clearly a number of factors which will influence the relationships between various markers. Investigation into these will form a part of the ANZDATA Registry's work program over the coming year, to allow better interpretation of the published KPIs.

Of course, it is illogical to expect a single marker to be a good reflection of all aspects of care. There are a wide variety of possible markers which could be utilised in evaluation, particularly given the number of biochemical parameters which are influenced by dialysis treatments.

However, for many of these the relationship between the marker and mortality risk is not clear, or may be governed by factors beyond the control of the treating centre. For example, there is good epidemiological data linking phosphate concentrations among dialysis patients with mortality, but interventional data is lacking.

The markers chosen have been selected on the basis of clinical relevance and amenability to modification. For both peritonitis and access at first haemodialysis there is an immediate and direct mortality risk to patients, they are factors over which a renal unit (and associated services) have a substantial degree of influence, they are easily measured, accurately defined and are responsive over a short time frame to changes in protocols or procedures.

CHAPTER 1

STOCK AND FLOW

Blair Grace
Leonie Excell
Stephen McDonald

The number of new patients in Australia decreased by 8% in 2009 after an increase of 7% in 2008 and a 2% decrease in 2007. While there is considerable variation in this rate of increase from year to year, over the longer term the rate of increase appears steady.

In New Zealand there was a 14% increase in new patients in 2009 after a 7% increase in 2008 and a 7% decrease in 2007. The number of new patients in 2009, (567) was the highest ever recorded.

Rates of prevalent patients and new patients are shown in Figures 1.1 - 1.3.

The overall number of new transplants (772) decreased by 5% in 2009 after an increase of 32% in Australia in 2008. In 2009, there were 326 live donor transplants reported, an 8% decrease after an increase of 31% in 2008 (354 transplants). This number was the second highest ever recorded.

Further data about stock and flow is shown in Figures 1.6 - 1.14.

The number of new transplants remained similar in 2009 in New Zealand (121 transplants) including 67 live donors, the second highest ever.

Figure 1.1

Prevalent Patients 2005 - 2009

(Number Per Million Population at 31st December)

	2005	2006	2007	2008	2009
Australia Total	**15,180 (747)**	**16,112 (778)**	**16,826 (801)**	**17,631 (825)**	**18,243 (834)**
No. Functioning Transplants • #	6541 (322)	6856 (331)	7108 (338)	7496 (351)	7902 (361)
No. Dialysis Patients	8639 (425)	9256 (447)	9718(462)	10,135 (474)	10,341 (473)
Proportion Home *	31%	31%	31%	31%	30%
Proportion Satellite HD	42%	43%	45%	46%	47%
Proportion CAPD/APD	22%	22%	22%	22%	21%
New Zealand Total	**3117 (754)**	**3245 (775)**	**3353 (793)**	**3452 (809)**	**3663 (849)**
No. Functioning Transplants • #	1239 (300)	1247 (298)	1284 (304)	1350 (316)	1403 (325)
No. Dialysis Patients	1878 (454)	1998 (477)	2069 (489)	2102 (492)	2260 (524)
Proportion Home *	54%	54%	52%	52%	51%
Proportion Satellite HD	16%	17%	19%	19%	19%
Proportion CAPD/APD	38%	38%	36%	36%	35%

• Country of Transplant # Patients lost to follow up are not included

* Proportion of all patients dialysing currently receiving home-based treatment (either PD or HD)

Figure 1.2

Patient Flow Summary 2005 - 2009

(Number Per Million Population at 31st December)

* Country of Transplant

	2005	2006	2007	2008	2009
Australia					
Total New Patients	2291 (113)	2430 (117)	2378 (113)	2534 (119)	2337 (107)
Total New Transplants *	623 (31)	641 (31)	615 (29)	813 (38)	772 (35)
Living Donor Transplants	246	273	271	354	326
Subsequent Transplants	84	92	88	105	99
Total Deaths	1365	1475	1629	1671	1666
Dialysis Patients	1202	1326	1459	1493	1525
Transplant Patients	163	149	170	178	141
New Zealand					
Total New Patients	461 (112)	500 (119)	466 (110)	497 (116)	567 (131)
Total New Transplants *	93 (22)	90 (22)	123 (29)	122 (29)	121 (28)
Living Donor Transplants	46	49	58	69	67
Subsequent Transplants	6	10	11	11	12
Total Deaths	331	367	343	388	365
Dialysis Patients	298	333	296	360	331
Transplant Patients	33	34	47	28	34

Figure 1.3

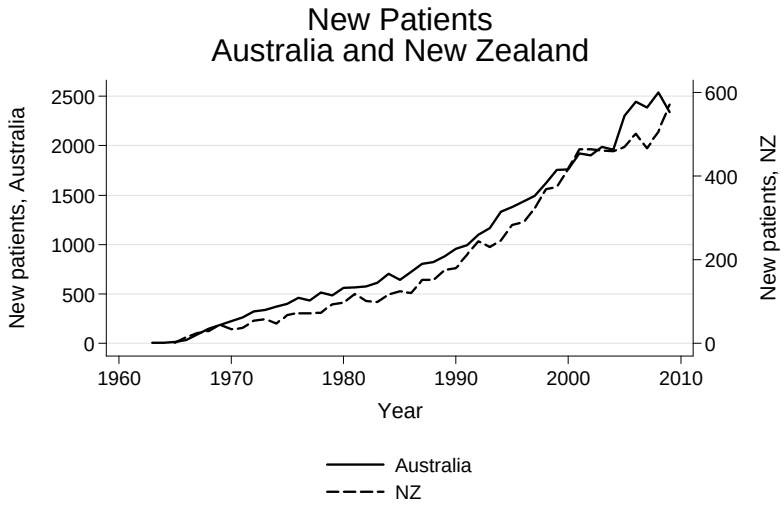


Figure 1.4

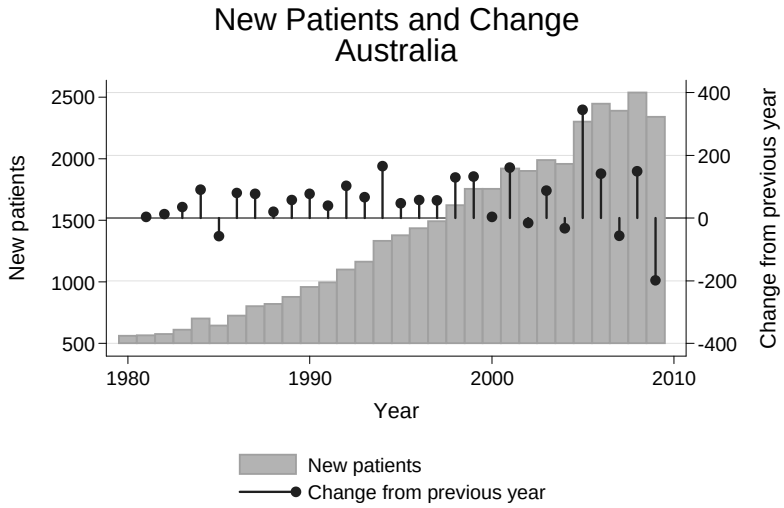


Figure 1.5

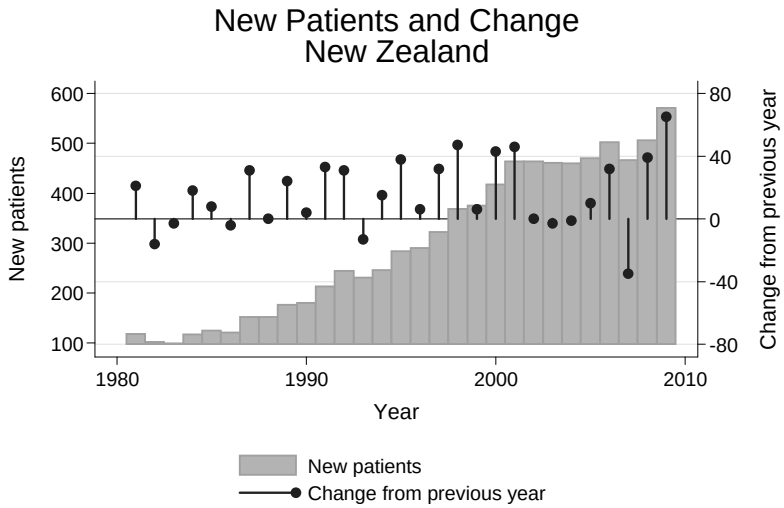


Figure 1.6

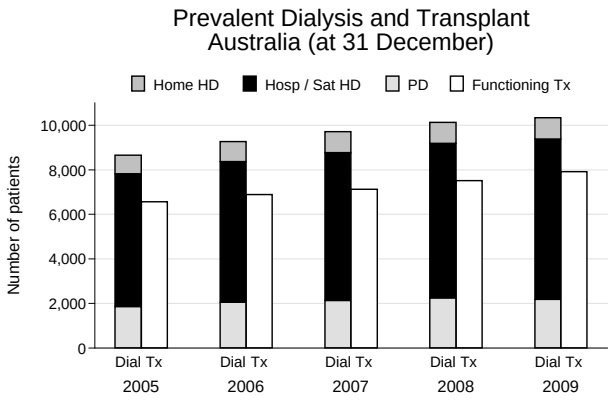
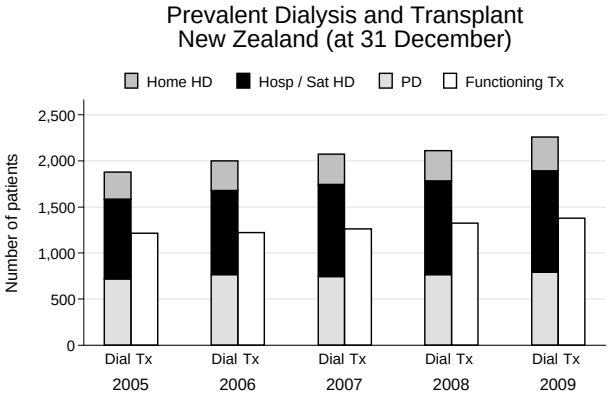


Figure 1.7



The incident rate among Australian Aboriginal, Maori and Pacific People is substantially higher than among non-indigenous people. This, together with lower rates of transplantation, leads to higher rates of prevalent dialysis patients (Figure 1.8).

Figure 1.8

Prevalence and Incidence by Indigenous Racial Origin, 2005 - 2009
(Number Per Million Population Per Year for Patients)
Aboriginal and Torres Strait Islanders Combined

Race		2005	2006	2007	2008	2009
Australia						
Aboriginal and Torres Strait Islanders	New Patients	216 (438)	221 (441)	237 (464)	249 (479)	189 (358)
	Dialysis	924 (1875)	988 (1970)	1090 (2135)	1157 (2227)	1174 (2220)
	Functioning Transplants *	134 (272)	148 (295)	148 (290)	159 (306)	160 (303)
	Transplant Operations	22 (45)	27 (54)	18 (35)	31 (60)	24 (45)
	Deaths	119 (242)	141 (281)	134 (263)	164 (316)	171 (323)
New Zealand						
Maori	New Patients	138 (223)	168 (269)	147 (232)	157 (244)	170 (260)
	Dialysis	640 (1036)	683 (1094)	687 (1085)	687 (1068)	723 (1107)
	Functioning Transplants *	111 (180)	111 (178)	113 (179)	117 (182)	127 (195)
	Transplant Operations	3 (5)	10 (16)	17 (27)	12 (19)	19 (29)
	Deaths	103 (167)	125 (200)	134 (212)	152 (236)	126 (193)
Pacific People	New Patients	74 (255)	79 (266)	76 (250)	87 (280)	99 (312)
	Dialysis	351 (1210)	371 (1250)	409 (1346)	433 (1393)	485 (1526)
	Functioning Transplants *	72 (248)	77 (259)	78 (257)	85 (273)	87 (274)
	Transplant Operations	4 (14)	7 (24)	6 (20)	10 (32)	6 (19)
	Deaths	44 (152)	54 (182)	34 (112)	55 177)	48 (151)

* By Transplanting Country

Figure 1.9

National and State Stock and Flow 1-Jan-2009 to 31-Dec-2009

( ) 31-Dec-2008 Figures

State	New Patients	Transplant Operations *	Deaths		Dialysis Dependent	Functioning Transplants # *	Total
			Dialysis	Transplant			
Queensland	486 (531)	136 (140)	310 (337)	27 (47)	1944 (1881)	1567 (1485)	**3511 (3366)**
New South Wales	717 (805)	222 (223)	489 (472)	53 (49)	3374 (3346)	2232 (2127)	**5606 (5473)**
Aust. Capital Territory	41 (61)	14 (14)	27 (35)	4 (3)	239 (235)	199 (197)	**438 (432)**
Victoria	541 (537)	211 (219)	346 (311)	18 (28)	2513 (2476)	2028 (1887)	**4541 (4363)**
Tasmania	53 (54)	20 (26)	27 (28)	1 (3)	194 (179)	190 (177)	**384 (356)**
South Australia	195 (185)	82 (106)	107 (102)	17 (21)	670 (629)	861 (829)	**1531 (1458)**
Northern Territory	72 (89)	5 (4)	43 (57)	4 (3)	418 (397)	68 (74)	**486 (471)**
Western Australia	232 (272)	82 (81)	176 (149)	51 (52)	989 (992)	781 (745)	**1770 (1737)**
Australia	**2337 (2534)**	**772 (813)**	**1525 (1493)**	**141 (178)**	**10,341 (10,135)**	**7926 (7521)**	**18,267 (17,656)**
New Zealand	**567 (497)**	**121 (122)**	**331 (360)**	**34 (28)**	**2260 (2102)**	**1379 (1325)**	**3639 (3427)**

Patients lost to follow-up are not included * Resident State

Figure 1.10

Prevalent Transplant and Dialysis Patients 1985 to 2009

Country of Transplant

Patients Lost of Follow-up are not included

(Number Per Million Population at 31 December)

	Australia			New Zealand		
Year	Transplant #	Dialysis	Total	Transplant #	Dialysis	Total
1985	2163 (137)	2230 (141)	**4393 (278)**	377 (115)	402 (122)	**779 (237)**
1986	2392 (149)	2339 (146)	**4731 (295)**	426 (131)	402 (124)	**828 (255)**
1987	2574 (158)	2526 (155)	**5100 (314)**	452 (138)	437 (133)	**889 (272)**
1988	2798 (169)	2675 (162)	**5473 (331)**	484 (147)	482 (147)	**966 (294)**
1989	3054 (182)	2750 (164)	**5804 (345)**	531 (161)	527 (160)	**1058 (321)**
1990	3265 (191)	2956 (173)	**6221 (365)**	579 (174)	557 (167)	**1136 (341)**
1991	3493 (202)	3138 (182)	**6631 (384)**	607 (174)	630 (180)	**1237 (354)**
1992	3699 (211)	3383 (193)	**7082 (405)**	677 (192)	674 (191)	**1351 (383)**
1993	3872 (219)	3703 (210)	**7575 (429)**	705 (197)	721 (202)	**1426 (399)**
1994	4064 (228)	4099 (230)	**8163 (457)**	731 (202)	784 (217)	**1515 (418)**
1995	4236 (234)	4518 (250)	**8754 (484)**	783 (213)	850 (231)	**1633 (445)**
1996	4449 (243)	4882 (267)	**9331 (510)**	824 (221)	934 (250)	**1758 (471)**
1997	4697 (254)	5190 (280)	**9887 (534)**	882 (233)	1017 (269)	**1899 (502)**
1998	4921 (263)	5536 (296)	**10,457 (559)**	936 (245)	1126 (295)	**2062 (540)**
1999	5091 (269)	6019 (318)	**11,110 (587)**	983 (256)	1230 (321)	**2213 (577)**
2000	5293 (276)	6408 (335)	**11,701 (611)**	1023 (265)	1331 (345)	**2354 (610)**
2001	5507 (284)	6850 (353)	**12,357 (637)**	1063 (274)	1462 (377)	**2525 (651)**
2002	5782 (294)	7263 (370)	**13,045 (664)**	1116 (283)	1594 (404)	**2710 (686)**
2003	6002 (302)	7720 (388)	**13,722 (690)**	1168 (290)	1711 (425)	**2879 (715)**
2004	6290 (313)	8004 (398)	**14,294 (711)**	1221 (299)	1774 (434)	**2995 (733)**
2005	6541 (322)	8639 (425)	**15,180 (747)**	1239 (300)	1878 (454)	**3117 (754)**
2006	6856 (331)	9256 (447)	**16,112 (778)**	1247 (298)	1998 (477)	**3245 (775)**
2007	7108 (338)	9718 (462)	**16,826 (801)**	1284 (304)	2069 (489)	**3353 (793)**
2008	7496 (351)	10,135 (474)	**17,631 (825)**	1350 (316)	2102 (492)	**3452 (809)**
2009	7902 (361)	10,341 (473)	**18,243 (834)**	1403 (325)	2260 (524)	**3663 (849)**

There is substantial variation in incidence rates and especially transplant rates leading to differences in the balance between dialysis and transplantation in various States (Figure 1.11 - 1.14).

Figure 1.11

Comparison of Prevalent Transplant and Dialysis Dependent Patients 2005 - 2009

(Number Per Million Population at 31 December)

	2005	2006	2007	2008	2009
Transplants **					
Queensland	1312 (331)	1353 (331)	1400 (335)	1485 (347)	1567 (356)
New South Wales *	1915 (291)	1991 (301)	2032 (304)	2127 (315)	2232 (324)
Aust. Capital Territory *	185 (349)	188 (347)	193 (351)	197 (354)	199 (351)
Victoria	1589 (316)	1688 (329)	1766 (339)	1887 (356)	2028 (374)
Tasmania	143 (295)	154 (314)	165 (334)	177 (355)	190 (378)
South Australia	707 (458)	746 (476)	784 (495)	829 (518)	861 (531)
Northern Territory	71 (350)	73 (347)	78 (363)	74 (336)	68 (302)
Western Australia	638 (317)	681 (331)	703 (334)	745 (344)	781 (349)
Australia	**6560 (323)**	**6874 (332)**	**7121 (339)**	**7521 (352)**	**7926 (362)**
New Zealand	**1220 (295)**	**1229 (294)**	**1271 (301)**	**1325 (310)**	**1379 (320)**
** By Resident State and Country					
Dialysis					
Queensland	1603 (404)	1704 (416)	1808 (432)	1881 (440)	1944 (441)
New South Wales *	2768 (421)	3025 (458)	3188 (477)	3346 (495)	3374 (490)
Aust. Capital Territory *	192 (362)	206 (380)	215 (391)	235 (422)	239 (422)
Victoria	2188 (436)	2345 (457)	2406 (462)	2476 (467)	2513 (463)
Tasmania	156 (321)	163 (333)	175 (355)	179 (359)	194 (386)
South Australia	569 (369)	604 (385)	626 (395)	629 (393)	670 (413)
Northern Territory	316 (1558)	334 (1585)	368 (1712)	397 (1805)	418 (1859)
Western Australia	847 (421)	875 (425)	932 (443)	992 (459)	989 (442)
Australia	**8639 (425)**	**9256 (447)**	**9718 (462)**	**10,135 (474)**	**10,341 (473)**
New Zealand	**1878 (454)**	**1998 (477)**	**2069 (489)**	**2102 (492)**	**2260 (524)**

* NSW population excludes residents of the Southern Area Health Service
* ACT population includes residents of the Southern Area Health Service
(Medical services in the ACT service this Southern Area Region)
Transplanted patients lost to follow up have been excluded

Figure 1.12

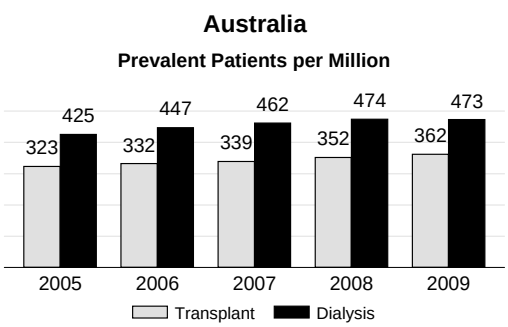


Figure 1.13

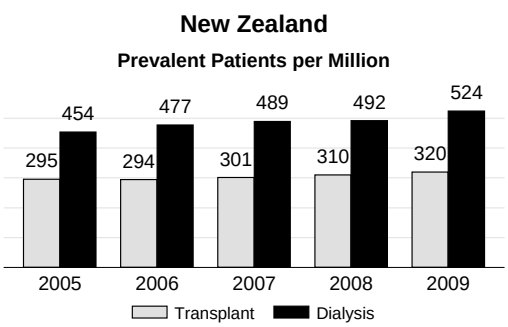
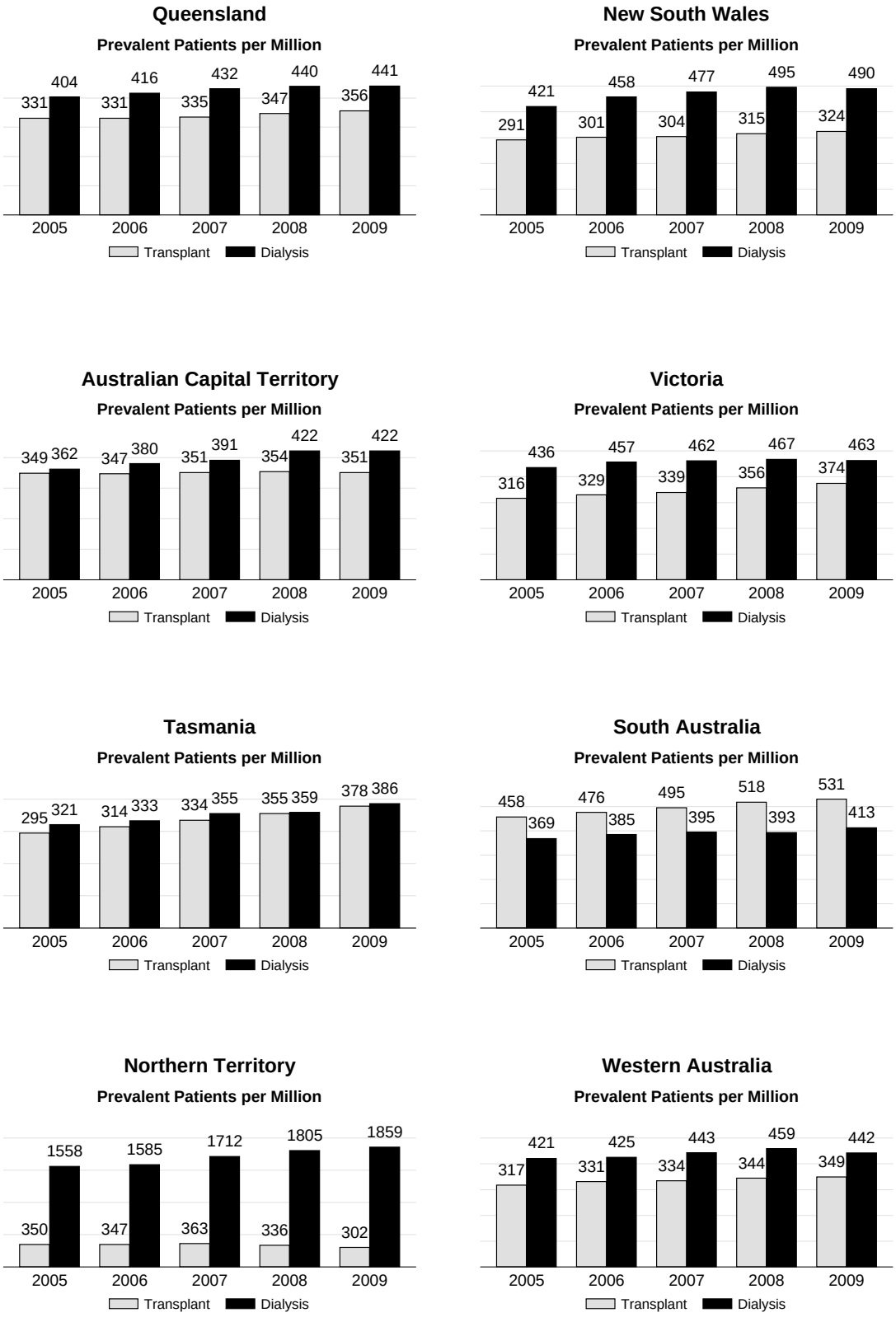


Figure 1.14

Comparison of Transplant and Dialysis Dependent Patients 2005 - 2009



CHAPTER 2

NEW PATIENTS

COMMENCING TREATMENT IN 2009

Blair Grace
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Figure 2.1

Annual Intake of New Patients 2005 - 2009
(Number Per Million Population)

	2005	2006	2007	2008	2009
Queensland	464 (117)	496 (121)	468 (112)	531 (124)	486 (110)
New South Wales	724 (110)	768 (116)	758 (113)	805 (119)	717 (104)
Aust. Capital Territory	49 (93)	55 (102)	55 (100)	61 (110)	41 (72)
Victoria	525 (105)	565 (110)	542 (104)	537 (101)	541 (100)
Tasmania	38 (78)	51 (104)	55 (111)	54 (108)	53 (105)
South Australia	171 (111)	184 (117)	167 (105)	185 (115)	195 (120)
Northern Territory	85 (419)	76 (361)	76 (354)	89 (405)	72 (320)
Western Australia	235 (117)	235 (114)	257 (122)	272 (126)	232 (104)
Australia	**2291 (113)**	**2430 (117)**	**2378 (113)**	**2534 (119)**	**2337 (107)**
New Zealand	**461 (112)**	**500 (119)**	**466 (110)**	**497 (116)**	**567 (131)**

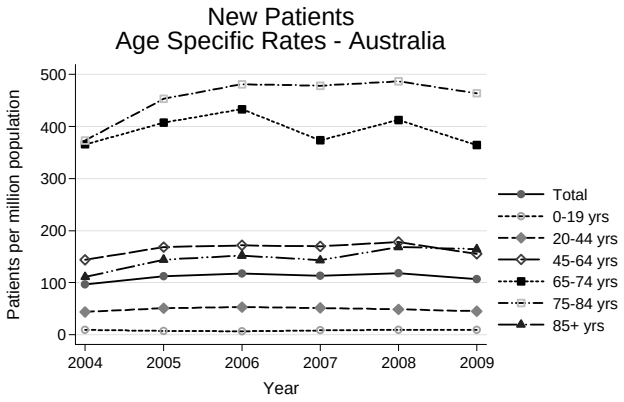
INTAKE OF NEW PATIENTS

There were 2337 new patients who commenced treatment for end-stage renal failure in Australia in 2009, a rate of 107 per million population per year.

This was a decrease of 8% from last year, following a 7% increase in 2008 and a 2% decrease in 2007. Overall, incidence rates appear to have stabilised over the past five years.

In New Zealand, the number of new patients entering renal failure programs was 567, a rate of 131 per million of population. This was the highest number ever reported and an increase of 14% following a 7% increase in 2008.

Figure 2.2



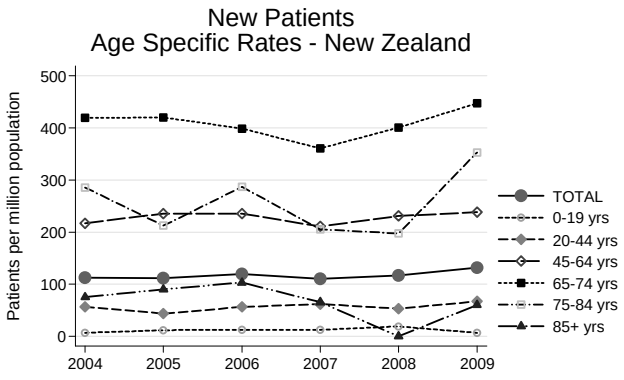
AGE OF NEW PATIENTS

In Australia in 2009, all age groups decreased in acceptance of new patients. The 0-19 year age and the ≥ 85 year age group were only slightly lower.

The largest decreases were in the groups 65-74 years, which fell from 413 to 364 per million (617 to 566 patients), the 45-64 year group, which fell from 178 to 155 per million (957 to 850 patients) and the 75-84 year group, from 487 to 464 per million (474 to 454 patients (Figure 2.2). The older age groups are examined in more detail in Figure 2.4.

The mean age of patients entering programs in Australia in 2009 was 60.7 years and the median 63.4 years (Figure 2.5).

Figure 2.3



In New Zealand, the mean age of patients entering was 57.6 years and the median 59.1 years (Figure 2.5).

The age specific rates of acceptance increased in all groups except the 0-19 year group, which fell from 19 to seven per million (23 patients to eight patients).

The largest increases were in the 75-84 year group from 197 to 352 per million (36 to 65 patients), the 20-44 year group from 53 to 67 per million (78 to 99 patients), the 65-74 year group from 401 to 447 per million (117 to 135 patients), the 45-64 year age group from 231 to 238 per million (243 to 256 patients) and the ≥ 85 year age group rose to 60 per million (there were no patients in 2008 to four patients this year), shown in Figure 2.3.

Within the older age groups in Australia, only the 75-79 and the ≥ 85 year age groups increased in numbers in 2009, as shown in Figure 2.4.

In New Zealand there were increases in all age groups in 2009.

Rates of new patients aged ≥ 85 years remained similar in Australia in 2009, 164 per million (63 patients) to 167 per million (61 patients) in 2008. There were four patients in this age group in New Zealand in 2009.

Rates in most age groups ≥ 70 years, were higher in Australia than in New Zealand except for the age group 70-74 years which was higher in New Zealand (476 per million and in Australia 417 per million population).

Figure 2.4

Acceptance of Elderly New Patients 2005 - 2009
(Number Per Million Population)

Country	Age Groups	2005	2006	2007	2008	2009
Australia	60-64 years	236 (250)	252 (255)	271 (255)	284 (252)	256 (219)
	65-69 years	261 (338)	280 (359)	248 (308)	302 (363)	280 (322)
	70-74 years	304 (485)	332 (528)	295 (458)	315 (475)	286 (417)
	75-79 years	266 (481)	300 (544)	284 (516)	281 (512)	290 (529)
	80-84 years	162 (404)	161 (397)	179 (432)	193 (456)	164 (381)
	>=85 years	44 (140)	49 (152)	49 (142)	61 (167)	63 (164)
	Total	**1273 (352)**	**1374 (374)**	**1326 (347)**	**1436 (363)**	**1339 (328)**
New Zealand	60-64 years	69 (378)	62 (332)	57 (289)	64 (302)	71 (321)
	65-69 years	63 (429)	61 (392)	56 (343)	66 (398)	73 (425)
	70-74 years	49 (409)	49 (408)	47 (384)	51 (405)	62 (476)
	75-79 years	28 (275)	29 (280)	28 (268)	29 (277)	49 (467)
	80-84 years	9 (124)	22 (297)	9 (119)	7 (90)	16 (202)
	>=85 years	5 (90)	6 (103)	4 (66)	0 (0)	4 (60)
	Total	**223 (328)**	**229 (328)**	**201 (278)**	**217 (289)**	**275 (355)**

STATE OF ORIGIN OF NEW PATIENTS

The age at start of dialysis varied between States (Figure 2.5). There was a decrease in the number of new renal replacement therapy patients in Australia in 2009 in most States except South Australia and Victoria.The highest acceptance rates were in the Northern Territory (320 per million) and South Australia (120 per million) and the lowest in the ACT (72 per million) and Victoria (100 per million) (Figure 2.1). Age specific rates for each State are shown in Figure 2.7.

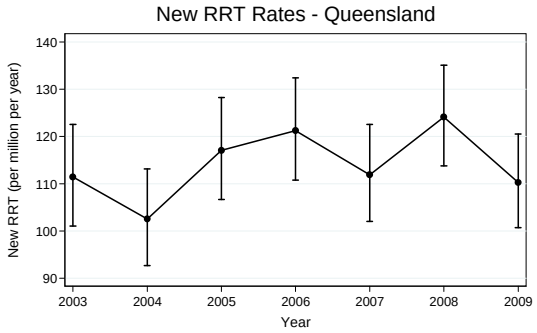
Figure 2.5

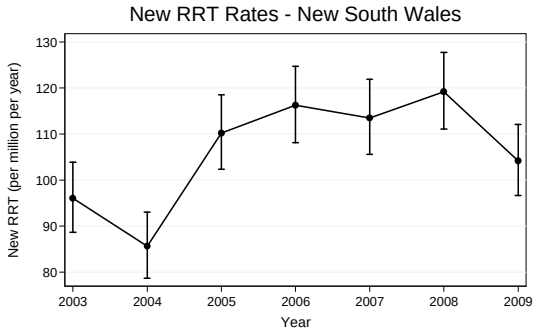
Age and Gender of New Patients 1-Jan-2009 to 31-Dec-2009
(n = Number of Patients)

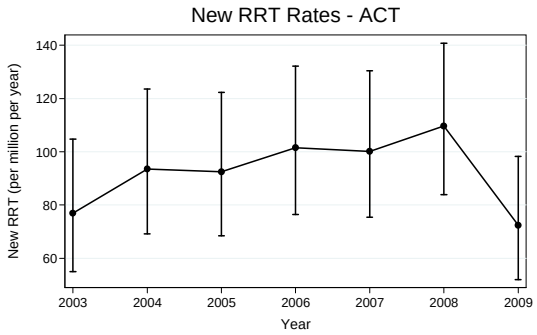
Age Groups Years	QLD (n=486)		NSW (n=717)		ACT (n=41)		VIC (n=541)		TAS (n=53)		SA (n=195)		NT (n=72)		WA (n=232)		AUST (n=2337)		NZ (n=567)	
	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
00-04	1	1	4	3	0	0	1	1	0	0	0	1	0	0	0	0	**6**	**6**	**1**	**0**
05-14	2	4	3	3	0	0	2	3	0	0	0	0	0	0	0	2	**7**	**12**	**1**	**1**
15-24	10	6	5	11	0	0	6	6	1	2	0	3	1	0	1	4	**24**	**32**	**5**	**6**
25-34	8	11	22	16	2	1	14	14	0	1	0	6	3	0	10	6	**59**	**55**	**9**	**22**
35-44	17	28	17	33	2	3	15	29	2	4	6	10	8	7	6	16	**73**	**130**	**31**	**31**
45-54	34	41	54	36	1	2	28	57	7	5	9	14	14	15	15	22	**162**	**192**	**52**	**78**
55-64	34	61	59	97	4	5	40	81	3	9	9	23	12	5	18	36	**179**	**317**	**47**	**79**
65-74	46	60	70	118	5	7	47	86	7	3	18	43	1	5	13	37	**207**	**359**	**54**	**81**
75-84	41	56	56	93	4	4	36	68	3	6	19	26	0	1	22	19	**181**	**273**	**29**	**36**
>=85	8	17	8	9	1	0	2	5	0	0	4	4	0	0	1	4	**24**	**39**	**3**	**1**
Total	**201**	**285**	**298**	**419**	**19**	**22**	**191**	**350**	**23**	**30**	**65**	**130**	**39**	**33**	**86**	**146**	**922**	**1415**	**232**	**335**
Mean	60.1	61.4	60	62.4	61.8	61.1	59	61	59.1	56.6	66.8	62.6	50.1	53	59.4	59.7	**59.8**	**61.2**	**57.5**	**57.6**
All	60.8		61.4		61.4		60.3		57.7		64		51.4		59.6		**60.7**		**57.6**	
Median	63.6		64.7		65.2		62.9		58		68.3		50.4		60.6		**63.4**		**59.1**	
Range	2.6 - 95.1		0.3 - 91.2		31.1 - 85.7		0.6 - 90.8		17.7 - 84.7		1.2 - 88.5		22.6 - 80.4		11.1 - 89.5		**0.3 - 95.1**		**3.5 - 88.0**	

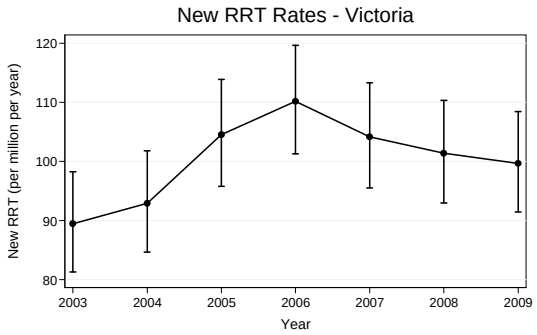
Figure 2.6

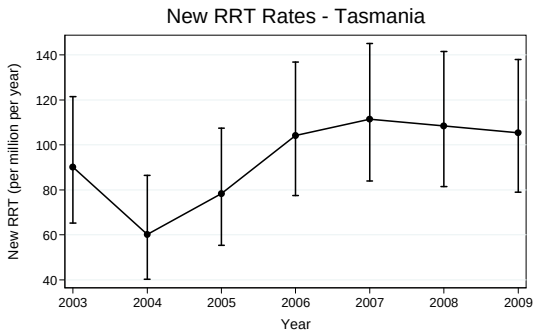
Incidence rates (95% confidence intervals) for new RRT patients by State.
Note different scales for each State; these are crude incidence rates, not age-adjusted.

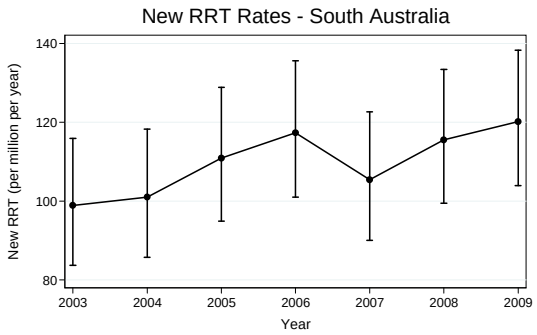












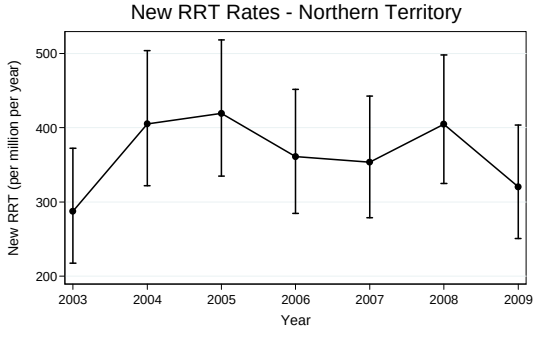
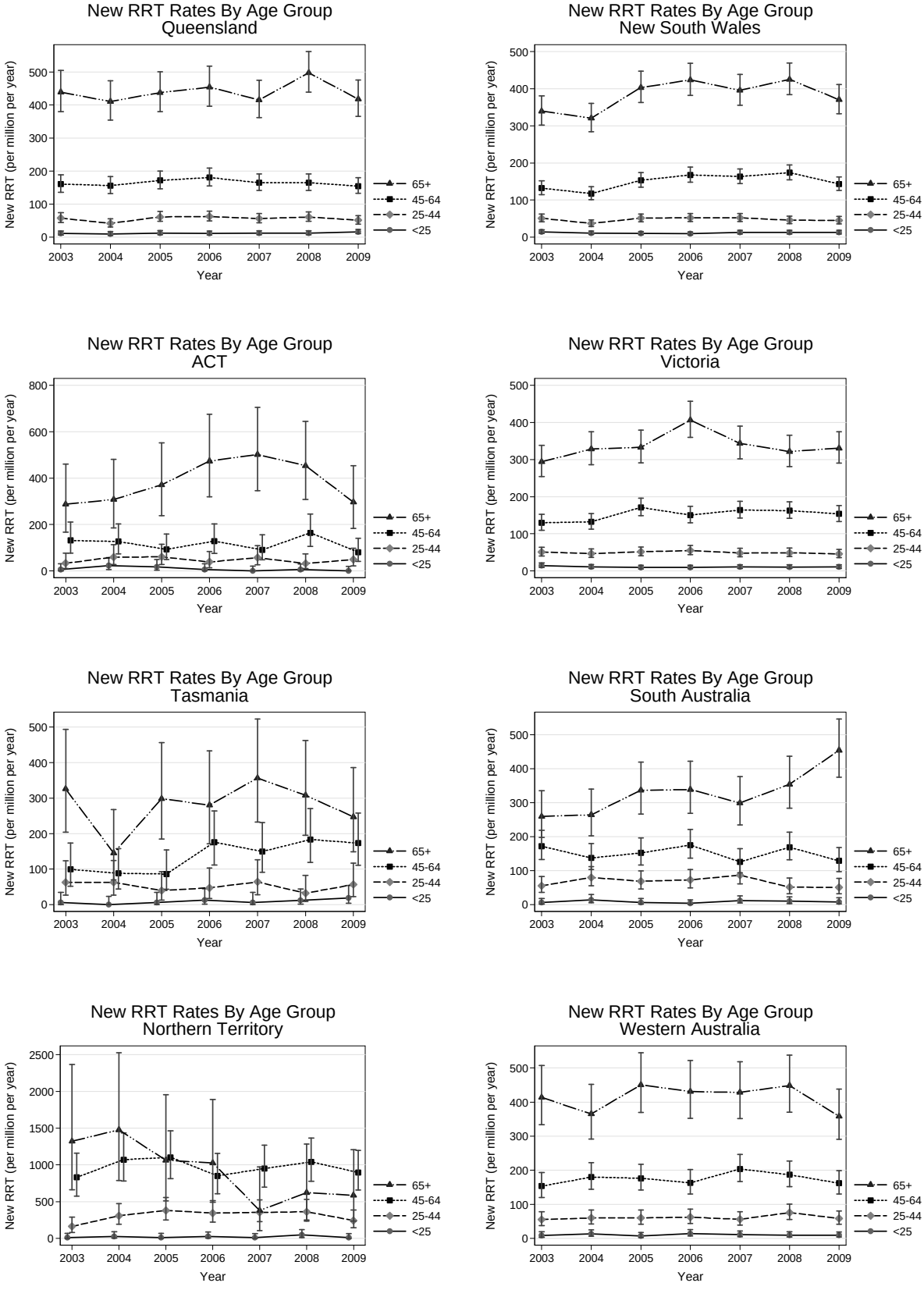


Figure 2.7

Incidence rates (95% confidence intervals) for new RRT patients by State by age group.
Note the Y axis scales for each State are different.



LATE REFERRAL

There were 21% (22% in 2008) of all new patients in Australia and 17% (23% in 2008) of new patients in New Zealand who were referred "late" to nephrological care, i.e. less than three months before first treatment (Figure 2.8).

Among the States/Territories, the lowest rate was 7% in the Northern Territory ranging to 27% in Victoria. Variation of this rate with age is shown in Figure 2.9, trends over time in Figure 2.10 and by racial origin in Figure 2.11. Late referral rates were particularly high in the ≥ 85 year age group.

Figure 2.8

Late Referral of New Patients 2009

Number of Patients (% Patients)

Primary Renal Disease	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
YES										
Analgesic	1 (1%)	2 (1%)	0 (0%)	2 (1%)	0 (0%)	0 (0%)	0 (0%)	1 (2%)	6 (1%)	0 (0%)
Diabetes-I Insulin	3 (3%)	4 (3%)	0 (0%)	5 (3%)	0 (0%)	1 (4%)	0 (0%)	0 (0%)	13 (3%)	0 (0%)
Diabetes-II Insulin Req	15 (14%)	23 (15%)	0 (0%)	17 (12%)	2 (18%)	1 (4%)	0 (0%)	5 (10%)	63 (13%)	24 (26%)
Diabetes-II Non-Insulin	14 (13%)	13 (8%)	0 (0%)	18 (12%)	0 (0%)	2 (9%)	3 (60%)	14 (29%)	64 (13%)	18 (19%)
Glomerulonephritis	19 (18%)	44 (29%)	1 (25%)	43 (29%)	2 (18%)	4 (17%)	2 (40%)	12 (25%)	127 (26%)	24 (26%)
Hypertension	18 (17%)	25 (16%)	2 (50%)	13 (9%)	1 (9%)	5 (22%)	0 (0%)	9 (19%)	73 (15%)	9 (10%)
Miscellaneous	23 (22%)	31 (20%)	0 (0%)	30 (20%)	4 (36%)	6 (26%)	0 (0%)	5 (10%)	99 (20%)	15 (16%)
Polycystic	2 (2%)	2 (1%)	0 (0%)	2 (1%)	1 (9%)	2 (9%)	0 (0%)	1 (2%)	10 (2%)	0 (0%)
Reflux	1 (1%)	3 (2%)	0 (0%)	6 (4%)	1 (9%)	1 (4%)	0 (0%)	1 (2%)	13 (3%)	0 (0%)
Uncertain	10 (9%)	7 (5%)	1 (25%)	11 (7%)	0 (0%)	1 (4%)	0 (0%)	0 (0%)	30 (6%)	4 (4%)
Sub Total	**106 (22%)**	**154 (21%)**	**4 (10%)**	**147 (27%)**	**11 (21%)**	**23 (12%)**	**5 (7%)**	**48 (21%)**	**498 (21%)**	**94 (17%)**
NO										
Analgesic	12 (3%)	15 (3%)	0 (0%)	1 (0%)	0 (0%)	2 (1%)	0 (0%)	0 (0%)	30 (2%)	2 (0%)
Diabetes-I insulin	13 (3%)	15 (3%)	0 (0%)	18 (5%)	0 (0%)	6 (3%)	1 (1%)	6 (3%)	59 (3%)	13 (3%)
Diabetes-II Insulin Req	60 (16%)	113 (20%)	7 (19%)	62 (16%)	5 (12%)	28 (16%)	8 (12%)	28 (15%)	311 (17%)	135 (29%)
Diabetes-II Non-insulin	51 (13%)	67 (12%)	4 (11%)	46 (12%)	4 (10%)	16 (9%)	27 (40%)	37 (20%)	252 (14%)	77 (16%)
Glomerulonephritis	74 (19%)	129 (23%)	11 (30%)	97 (25%)	12 (29%)	45 (26%)	15 (22%)	55 (30%)	438 (24%)	98 (21%)
Hypertension	58 (15%)	89 (16%)	4 (11%)	44 (11%)	5 (12%)	29 (17%)	4 (6%)	25 (14%)	258 (14%)	52 (11%)
Miscellaneous	34 (9%)	56 (10%)	3 (8%)	37 (9%)	2 (5%)	11 (6%)	1 (1%)	12 (7%)	156 (8%)	38 (8%)
Polycystic	35 (9%)	46 (8%)	6 (16%)	36 (9%)	6 (14%)	14 (8%)	2 (3%)	13 (7%)	158 (9%)	34 (7%)
Reflux	15 (4%)	18 (3%)	2 (5%)	17 (4%)	1 (2%)	4 (2%)	0 (0%)	8 (4%)	65 (4%)	9 (2%)
Uncertain	28 (7%)	15 (3%)	0 (0%)	36 (9%)	7 (17%)	17 (10%)	9 (13%)	0 (0%)	112 (6%)	15 (3%)
Sub Total	**380 (78%)**	**563 (79%)**	**37 (90%)**	**394 (73%)**	**42 (79%)**	**172 (88%)**	**67 (93%)**	**184 (79%)**	**1839 (79%)**	**473 (83%)**
Total (100%)	**486**	**717**	**41**	**541**	**53**	**195**	**72**	**232**	**2337**	**567**

Figure 2.9

Late Referral - All Modes of Treatment Including Pre-emptive Transplants
New Patients 1-Jan-2005 to 31-Dec-2009

Country	Age Groups						Total
	0-19	20-44	45-64	65-74	75-84	>=85	
Australia							
Yes	59 (26%)	492 (26%)	941 (21%)	634 (22%)	512 (22%)	87 (33%)	2725 (23%)
No	168 (74%)	1388 (74%)	3474 (79%)	2270 (78%)	1766 (78%)	179 (67%)	9245 (77%)
Total (100%)	**227**	**1880**	**4415**	**2904**	**2278**	**266**	**11,970**
New Zealand							
Yes	33 (44%)	109 (26%)	234 (20%)	89 (15%)	42 (19%)	2 (11%)	509 (20%)
No	42 (56%)	306 (74%)	945 (80%)	488 (85%)	184 (81%)	17 (89%)	1982 (80%)
Total (100%)	**75**	**415**	**1179**	**577**	**226**	**19**	**2491**

Figure 2.10

Late Referral - All Modes of Treatment
Including Pre-emptive Transplants 2005 to 2009

Country	Years				
	2005	2006	2007	2008	2009
Australia					
Yes	553 (24%)	557 (23%)	562 (24%)	555 (22%)	498 (21%)
No	1738 (76%)	1873 (77%)	1816 (76%)	1979 (78%)	1839 (79%)
Total (100%)	**2291**	**2430**	**2378**	**2534**	**2337**
New Zealand					
Yes	97 (21%)	110 (22%)	96 (21%)	112 (23%)	94 (17%)
No	364 (79%)	390 (78%)	370 (79%)	385 (77%)	473 (83%)
Total (100%)	**461**	**500**	**466**	**497**	**567**

Figure 2.11

Late Referral - All Modes of Treatment
Including Pre-emptive Transplants
By Race 2005 to 2009

Country	Race					
	Asian	Aboriginal / TSI	Caucasoid	Maori	Pacific People	Other
Australia						
Yes	222 (23%)	328 (29%)	2050 (22%)	23 (28%)	57 (29%)	45 (28%)
No	739 (77%)	784 (71%)	7408 (78%)	59 (72%)	140 (71%)	115 (72%)
Total (100%)	**961**	**1112**	**9458**	**82**	**197**	**160**
New Zealand						
Yes	25 (15%)	-	193 (17%)	205 (26%)	86 (21%)	0 (0%)
No	140 (85%)	-	929 (83%)	575 (74%)	329 (79%)	9 (100%)
Total (100%)	**165**	**-**	**1122**	**780**	**415**	**9**

CO-MORBID CONDITIONS

Co-morbid conditions at entry to RRT are shown in Figures 2.12 - 2.18. The proportion of people with Type II diabetes as a primary renal disease continues to be more common in New Zealand.

(See Appendix II and III for further analyses of co-morbid conditions)

Figure 2.12

Co-morbid Conditions at Entry to Program 2009

Number of Patients (% Patients)

Country		Chronic Lung Disease	Coronary Artery Disease	Peripheral Vascular Disease	Cerebro-Vascular Disease	Smoking		Diabetes (Including Diabetic Nephropathy)	
Australia n=2337	Yes	271 (12%)	802 (34%)	444 (19%)	265 (11%)	Current	249 (11%)	Type 1	82 (4%)
	Suspected	94 (4%)	153 (7%)	172 (7%)	69 (3%)	Former	958 (41%)	T2 Ins Req	458 (20%)
	No	1972 (84%)	1382 (59%)	1721 (74%)	2003 (86%)	Never	1130 (48%)	T2 Non ins	516 (22%
								No	1281 (55%)
New Zealand n=567	Yes	69 (12%)	148 (26%)	67 (12%)	58 (10%)	Current	81 (14%)	Type 1	14 (2%)
	Suspected	36 (6%)	61 (11%)	34 (6%)	10 (2%)	Former	215 (38%)	T2 Ins Req	167 (29%)
	No	462 (81%)	358 (63%)	466 (82%)	499 (88%)	Never	271 (48%)	T2 Non ins	118 (21%
								No	268 (47%)

Figure 2.13

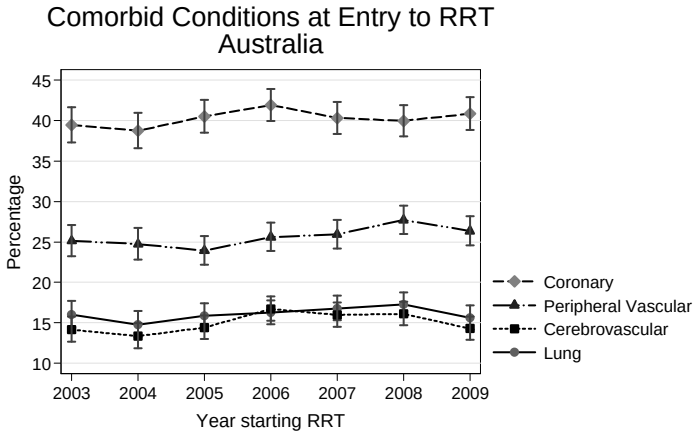


Figure 2.14

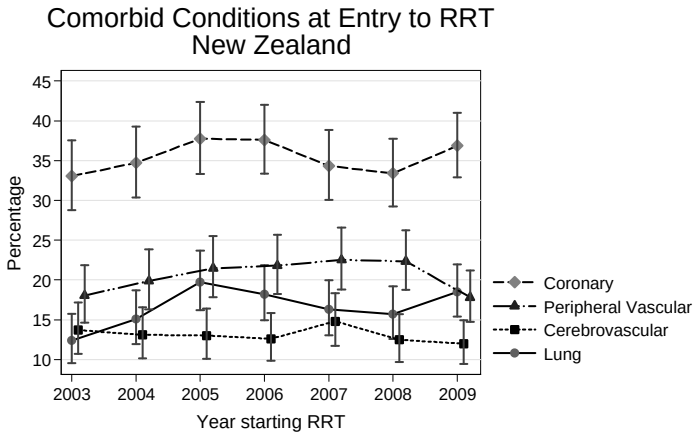


Figure 2.15

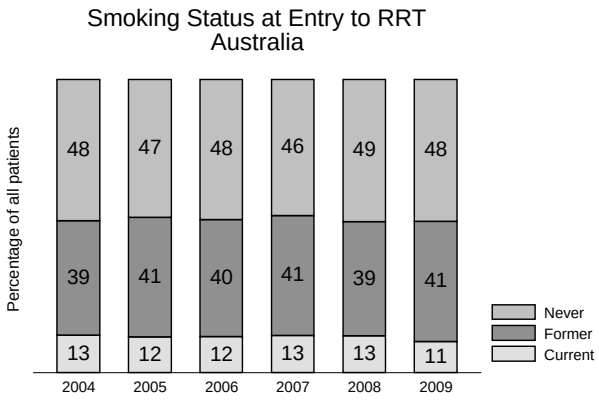


Figure 2.16

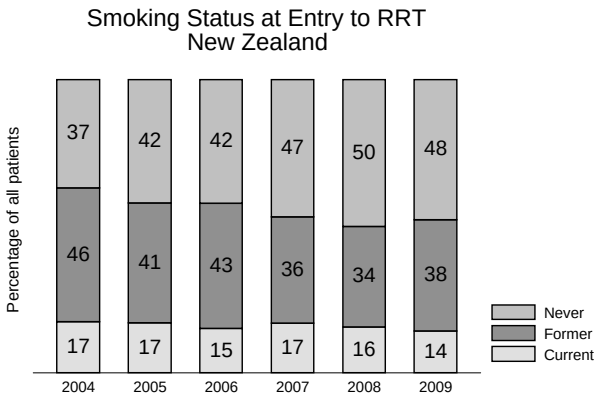


Figure 2.17

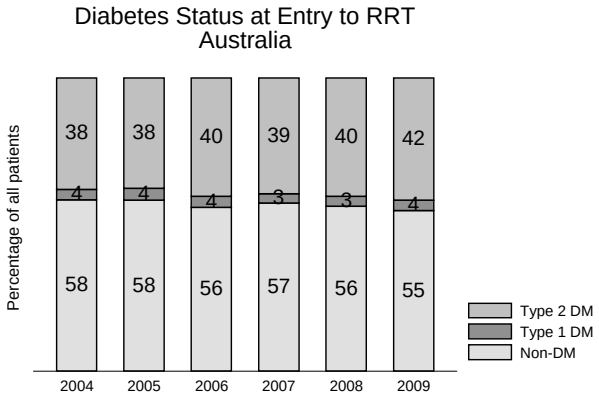
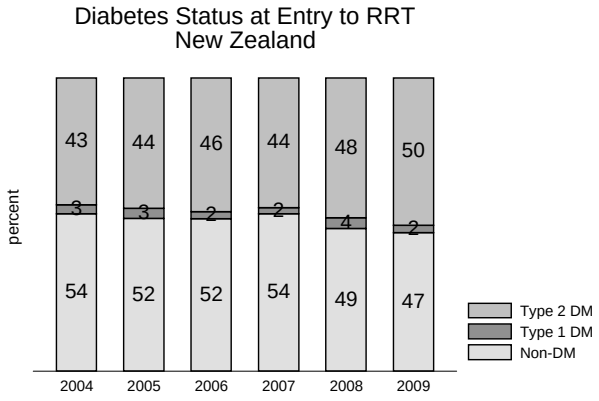


Figure 2.18



PRIMARY RENAL DISEASE OF NEW PATIENTS

AUSTRALIA

Diabetic nephropathy (33% of all new patients), continues for the sixth year in succession as the most common cause of primary renal disease (Figure 2.19).

Diabetes Type II (non-insulin and insulin requiring) represented 91% of diabetic nephropathy, the same as for 2008 and 2007.

Glomerulonephritis (24%) was the next most common cause of ESRD, followed by hypertension (14%), polycystic kidney disease (7%), reflux nephropathy (3%) and analgesic nephropathy (2%). The number of **analgesic nephropathy** patients decreased 28% (36 patients) from 2008 (50 patients) and was the lowest reported since 1969.

IgA + mesangioproliferative GN (24% of all GN) was the most common histologically proven form of glomerulonephritis (32% of biopsy proven glomerulonephritis), followed by **focal sclerosing GN, including primary and secondary focal sclerosing** (15%) (Figure 2.20).

Amongst the **miscellaneous diseases** causing end stage renal failure, there were 38 cases of multiple myeloma, 19 interstitial nephritis, 18 lithium toxicity, 16 cortical necrosis, 15 congenital renal hypoplasia and dysplasia, 14 haemolytic uraemic syndrome,12 amyloid and ten due to calcineurin inhibitor nephrotoxicity (Figure 2.21).

A renal biopsy based diagnosis was reported in 31% of cases: glomerulonephritis 76%, hypertension 20%, reflux 17%, diabetes (types I and II) 13%, analgesic nephropathy 8% and polycystic kidney disease 4% (Figure 2.22).

NEW ZEALAND

Diabetic nephropathy (47%) was the most common cause of ESRD followed by glomerulonephritis (22%) and hypertension (11%).

Diabetes Type II (non-insulin and insulin requiring) represented 95% of diabetic nephropathy.

Focal sclerosing GN, **including primary and secondary focal sclerosing** (22%) and **IgA + mesangioproliferative GN** (13%) represented 32% of biopsy proven glomerulonephritis (Figure 2.20).

Biopsy rates (26%) were lower than those in Australia (31%) in 2009.

Figure 2.19

Causes of ESRD 2006 - 2009
Number of Patients (% Patients)

Disease	2006	2007	2008	2009
Australia				
Glomerulonephritis	551 (23%)	581 (24%)	570 (22%)	565 (24%)
Analgesic Nephropathy	54 (2%)	44 (2%)	50 (2%)	36 (2%)
Polycystic Kidney	152 (6%)	145 (6%)	162 (6%)	168 (7%)
Reflux Nephropathy	93 (4%)	69 (3%)	75 (3%)	78 (3%)
Hypertension	359 (15%)	380 (16%)	365 (14%)	331 (14%)
Diabetic Nephropathy	796 (33%)	745 (31%)	859 (34%)	762 (33%)
Miscellaneous	294 (12%)	261 (11%)	262 (10%)	255 (11%)
Uncertain Diagnosis	131 (5%)	153 (6%)	191 (8%)	142 (6%)
Total (100%)	**2430**	**2378**	**2534**	**2337**
New Zealand				
Glomerulonephritis	107 (21%)	115 (25%)	101 (20%)	122 (22%)
Analgesic Nephropathy	1 (<1%)	3 (1%)	2 (<1%)	2 (<1%)
Polycystic Kidney	36 (7%)	29 (6%)	23 (5%)	34 (6%)
Reflux Nephropathy	14 (3%)	10 (2%)	14 (3%)	9 (2%)
Hypertension	58 (12%)	50 (11%)	46 (9%)	61 (11%)
Diabetic Nephropathy	211 (42%)	191 (41%)	227 (46%)	267 (47%)
Miscellaneous	39 (8%)	53 (11%)	62 (12%)	53 (9%)
Uncertain Diagnosis	34 (7%)	15 (3%)	22 (4%)	19 (3%)
Total (100%)	**500**	**466**	**497**	**567**

Figure 2.20

Types of Glomerulonephritis
1-Jan-2009 to 31-Dec-2009
Number (% of all GN)

	Australia	New Zealand
Presumed GN - No Biopsy performed	116 (21%)	30 (25%)
Focal Sclerosing	33 (6%)	8 (7%)
Primary Focal Sclerosing	45 (8%)	16 (13%)
Secondary Focal Sclerosing	5 (1%)	3 (2%)
MCGN - Type I	11 (2%)	6 (5%)
MCGN - Type II	6 (1%)	1 (1%)
Membranous GN	25 (4%)	6 (5%)
Rapidly Progressive GN	15 (3%)	3 (2%)
Mesangioproliferative IgA +	137 (24%)	16 (13%)
Mesangioproliferative IgA -	8 (1%)	2 (2%)
Mesangioproliferative No I.F. Studies	6 (1%)	2 (2%)
Focal and Segmental Proliferative GN	30 (5%)	4 (3%)
Advanced GN (end-stage type)	20 (4%)	3 (2%)
Goodpasture's Syndrome	8 (1%)	2 (2%)
Systemic Lupus	31 (5%)	5 (4%)
Henoch-Schonlein Purpura	1 (<1%)	3 (2%)
Wegener's Granulomatosis	15 (3%)	-
Microscopic Polyarteritis	18 (3%)	3 (2%)
Scleroderma	8 (1%)	2 (2%)
GN Other	6 (1%)	1 (1%)
Familial GN (including Alports)	18 (3%)	3 (2%)
Anti GBM (no haemoptysis)	2 (<1%)	3 (2%)
GN (with systemic disease)	1 (<1%)	-
Total	**565**	**122**

Figure 2.21

Miscellaneous Causes of ESRD 1-Jan-2009 to 31-Dec-2009

Renal Disease	Aust (255)	NZ (53)	Renal Disease	Aust (255)	NZ (53)
Interstitial Nephritis	19	9	Cortical Necrosis	16	1
Lithium Toxicity	18	4	Haemolytic Uraemic Syndrome	14	1
Calcineurin Inhibitor Toxicity	10	2	Chronic Haemolysis	1	-
Loss of a Single Kidney	5	1			
Lead Nephropathy	3	-	Obstructive Nephropathy	26	4
Pyelonephritis	2	-	Ureteric Obstructive Nephropathy	7	2
Sarcoidosis	2	-	Bladder Neck Obstruction	4	-
Acute Myeloid-Graft vs Host Disease	1	-	Neuropathic Bladder	3	1
Acute Tubular Necrosis	1	1	Posterior Urethral Valves	2	1
Cystinosis	1	-	Spina Bifida	-	2
Contrast Induced Nephropathy	1	-	Lower Urinary Tract Abnormalities		
Familial Hyperuricaemic Nephropathy	-	1	(Congenital Abnormalities)	1	-
Gout	1	-	Pelvi-Ureteric Junction Obstruction	1	-
HIV Nephropathy	1	-			
Hyperfiltration Nephropathy	-	1	Congenital Renal Hypoplasia and Dysplasia	15	3
Nephrocalcinosis	-	1	(L) Atrophic-(R) Pyelonephritis	1	-
Post Partum Nephropathy	1	-	(L) Renal Artery Stenosis-(R) Tuberculosis	-	1
Sjogren's Syndrome	1	-	Renal Coloboma Syndrome	1	-
Streptomycin Toxicity	1	-			
Trauma-Motor Vehicle Accident	1	-	Multiple Myeloma	38	7
Tuberous Sclerosis	1	-	Amyloid	12	2
			Light Chain Nephropathy (Benign)	2	-
Congestive Cardiac Failure	3	-			
Multiorgan Failure	3	-	Renal Cell Carcinoma	10	-
Hepato-Renal Syndrome	2	-	Transitional Cell Carcinoma	5	-
Ischaemic Cardiomyopathy	1	-	Radiation Nephropathy	2	-
Secondary Congenital Heart Disease	1	-	Carboplatin Nephrotoxicity	-	1
Septic Arthritis	1	-	Chemotherapy-(L) Renal Fibrosis	1	-
			Cysplatin Induced Nephrotoxicity	-	1
Calculi	7	4	Wilm's Tumour	1	-
Medullary Cystic	4	-			
Juvenile Nephronophthisis	-	1			
Multicystic Kidneys	-	1			

Renal biopsy rates vary widely with different types of disease (Figure 2.23). This year in Australia, 31% of patients were biopsied compared to 28% the previous year. Among patients with glomerulonephritis as a primary renal disease, the number biopsied rose from 72% in 2008 to 76% this year. (Figure 2.24). Biopsy rates in New Zealand are lower, particularly for diabetic nephropathy (Figure 2.25).

Figure 2.22

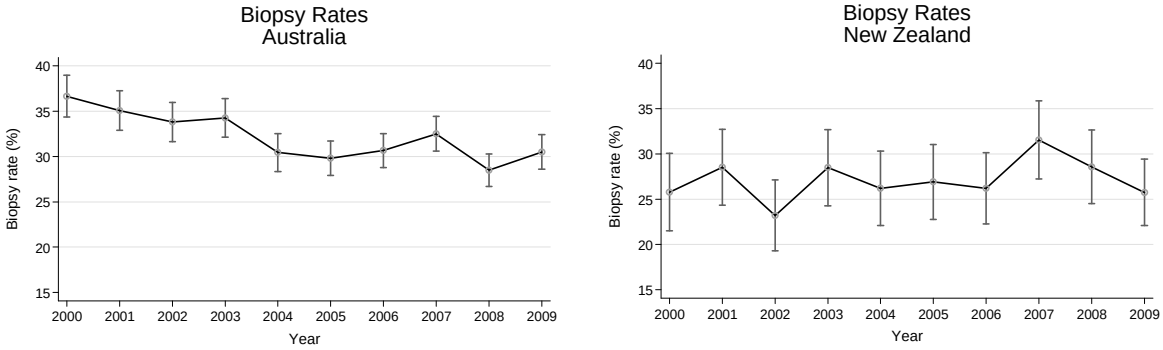


Figure 2.23

Biopsy of New Patients 2009

Biopsy	Primary Renal Disease	Qld	NSW	ACT	Vic	Tas	SA	NT	WA	Aust	NZ
Yes	Analgesic	-	3	-	-	-	-	-	-	**3**	**-**
	Diabetes-I Insulin Dependent	5	6	-	1	-	3	-	-	**15**	**-**
	Diabetes-II Insulin Requiring	11	12	2	13	3	4	-	-	**45**	**17**
	Diabetes-II Non-Insulin	5	8	1	9	3	4	2	6	**38**	**9**
	Glomerulonephritis	74	140	10	112	11	41	6	35	**429**	**90**
	Hypertension	17	19	-	20	2	6	1	2	**67**	**9**
	Miscellaneous	23	31	2	19	5	4	-	4	**88**	**20**
	Polycystic	3	1	-	2	-	-	-	-	**6**	**-**
	Reflux	2	4	-	5	1	-	-	1	**13**	**-**
	Uncertain	4	-	-	2	1	2	-	-	**9**	**1**
	Sub Total	**144**	**224**	**15**	**183**	**26**	**64**	**9**	**48**	**713**	**146**
No	Analgesic	13	14	-	3	-	2	-	1	**33**	**2**
	Diabetes-I Insulin Dependent	11	13	-	22	-	4	1	6	**57**	**13**
	Diabetes-II Insulin Requiring	64	124	5	66	4	25	8	33	**329**	**142**
	Diabetes-II Non-insulin	60	72	3	55	1	14	28	45	**278**	**86**
	Glomerulonephritis	19	33	2	28	3	8	11	32	**136**	**32**
	Hypertension	59	95	6	37	4	28	3	32	**264**	**52**
	Miscellaneous	34	56	1	48	1	13	1	13	**167**	**33**
	Polycystic	34	47	6	36	7	16	2	14	**162**	**34**
	Reflux	14	17	2	18	1	5	-	8	**65**	**9**
	Uncertain	34	22	1	45	6	16	9	-	**133**	**18**
	Sub Total	**342**	**493**	**26**	**358**	**27**	**131**	**63**	**184**	**1624**	**421**
	Total	**486**	**717**	**41**	**541**	**53**	**195**	**72**	**232**	**2337**	**567**

Fifteen per cent of all patients with diabetic nephropathy in Australia (1105/7426) and 8% (184/2414 in New Zealand) have had a biopsy proven diagnosis since this data was first collected by the Registry from 1st April, 1997

Figure 2.24

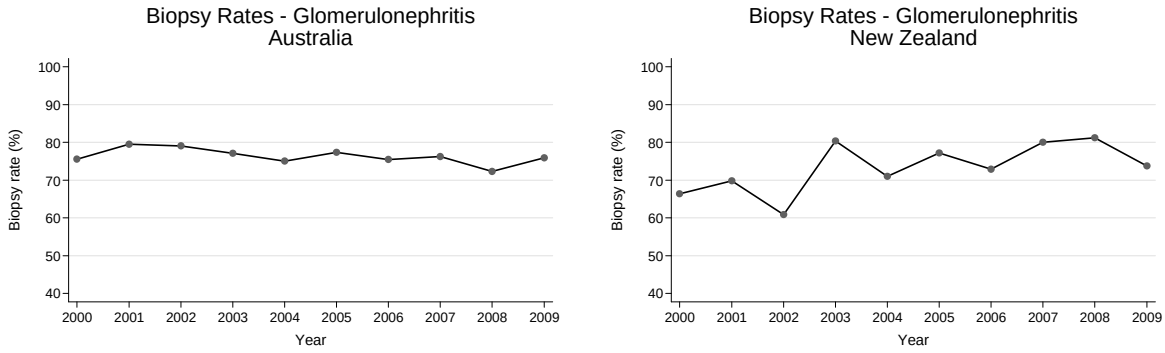
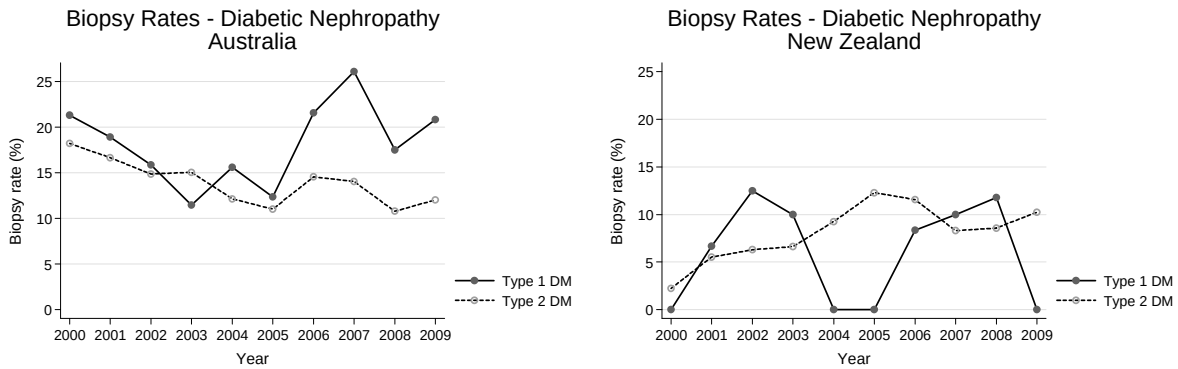


Figure 2.25



CHAPTER 3

DEATHS

Stephen McDonald
Leonie Excell
Brian Livingston

INTRODUCTION

The format of the deaths chapter has been substantially revised for this report.

Observed survival for non-indigenous patients who started in the period 2000-2009 is shown in Figure 3.1. This data is censored at transplantation-survival after transplantation is covered in subsequent chapters, as is survival of indigenous people.

Crude unadjusted death rates for dialysis and transplantation are shown in Figure 3.2 for various groups and comparisons in 3.3. Rates are generally higher with older age, diabetes and coronary artery disease. The comparison between indigenous rates (and some other comparisons) will be subject to several confounders.

The evolution of death rates by year of starting dialysis is illustrated in Figure 3.4-3.7. Across both dialysis and transplantation, there are suggestions of a slight reduction in mortality rates among those who commenced dialysis in more recent years. Expected survival is a crucial part of counseling patients, but these "averages" must be interpreted in the context of individual patients .

Figure 3.1

Survival for People who Commenced Dialysis 2000—2009 (Non-Indigenous) % (95% CI)

Age at Start	Time Period (Years)	Proportion Surviving Aust (95 % CI)	Proportion Surviving NZ (95 % CI)
0– 24	1	97 (95—98)	96 (90—98)
	2	93 (89—96)	94 (86—98)
	5	89 (83—92)	81 (58—92)
25—44	1	97 (96—97)	98 (95—99)
	2	91 (90—98)	94 (89—96)
	5	79 (76—82)	70 (61—78)
45—64	1	91 (90—92)	90 (88—92)
	2	84 (82—85)	79 (76—82)
	5	59 (57—61)	49 (44—54)
65—74	1	85 (84—86)	84 (81—87)
	2	71 (70—73)	72 (68—75)
	5	39 (37—41)	34 (29—39)
75—84	1	79 (78—85)	73 (68—78)
	2	61 (60—63)	52 (46—58)
	5	24 (22—26)	20 (15—26)
85 +	1	67 (62—72)	61 (41—76)
	2	48 (42—54)	43 (25—60)
	5	15 (10—22)	16 (5—32)

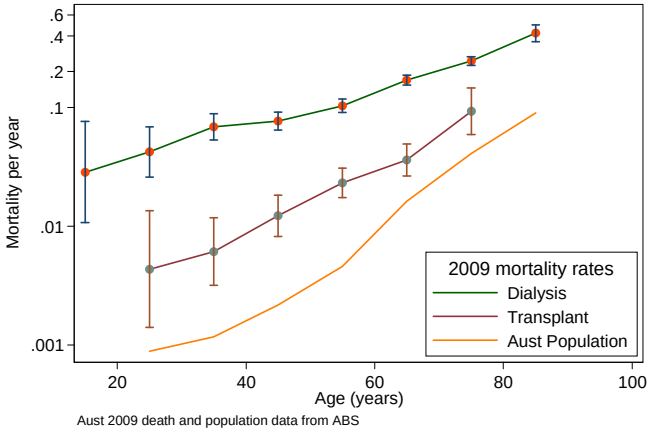
Figure 3.2

Death Rates During Renal Replacement Therapy
All Patients Included who Received Treatment During 2009

Group	Dialysis Mortality Rate (per 100 patient years, 95% CI)	Dialysis Number of Deaths Included in Analysis	Transplant Mortality Rate (per 100 patient years, 95% CI)	Transplant Number of Deaths Included in Analysis
OVERALL	**15.4 (14.7—16.2)**	**1641**	**1.23 (1.08—1.40)**	**221**
Australia	15.3 (14.5—16.2)	1340	1.20 (1.04—1.40)	182
New Zealand	18.8 (14.3—18.0)	301	1.36 (1.00—1.87)	39
AGES (YEARS)				
< 25	3.3 (1.5—7.3)	6	0.35 (0.17—0.74)	7
25—44	6.2 (5.0—7.9)	72	0.53 (0.37—0.74)	33
45—64	10.2 (9.3—11.2)	418	1.62 (1.36—1.92)	130
65—84	20.5 (19.3—21.8)	998	3.11 (2.36 –4.09)	51
≥ 85	43.9 (37.4—51.7)	147	-	0
DIABETES (AT RRT START)				
Non-diabetic	13.0 (12.1—14.0)	758	0.98 (0.83—1.15)	150
Type 1	15.8 (11.7—21.3)	43	1.32 (0.86—2.06)	20
Type 2	18.5 (17.2—19.7)	840	4.35 (3.30—5.72)	51
CORONARY ARTERTY DISEASE (AT RRT START)				
No	11.2 (10.4—12.0)	741	1.00 (0.86—1.17)	166
Yes	22.5 (21.1—24.0)	900	3.98 (3.06—5.19)	55
INDIGENOUS				
Non-Indigenous (Australia)	15.6 (14.8—16.6)	1170	1.13 (0.97—1.32)	165
Non-Indigenous (New Zealand)	17.3 (14.7—20.3	145	1.36 (0.97—1.92)	33
Aboriginal /Torres Strait Islanders	14.3 (12.2—16.9)	147	5.17 (3.17—8.44)	16
Maori (in New Zealand)	17.5 (14.5—21.1)	111	2.26 (1.01—5.03)	6
Pacific People (in New Zealand)	11.2 (8.4—15.0)	48	Not calculated	0

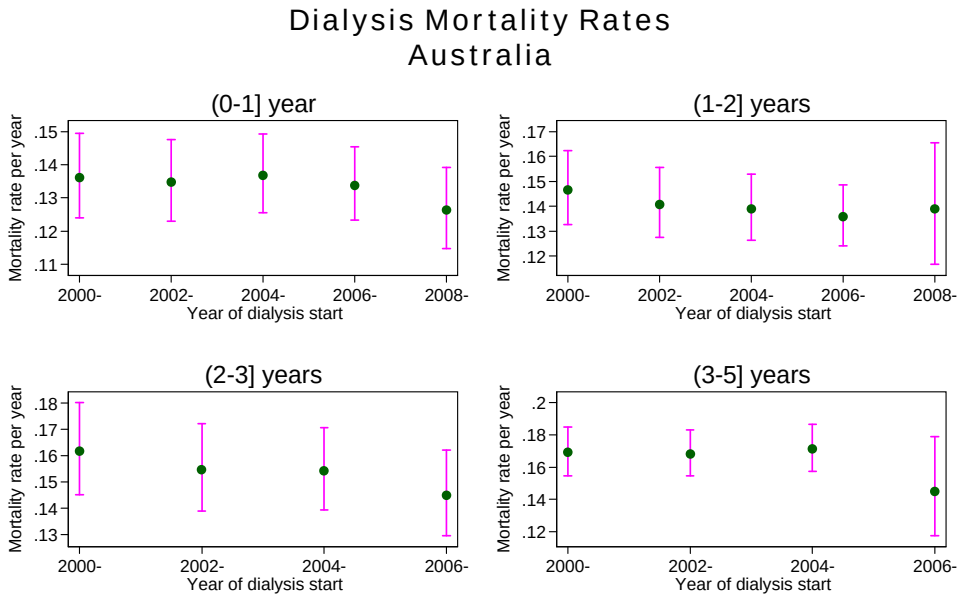
Figure 3.3

Age Specific Mortality Rates for Patients
Treated with Dialysis or Transplantation
Relative to the Australian Population 2009



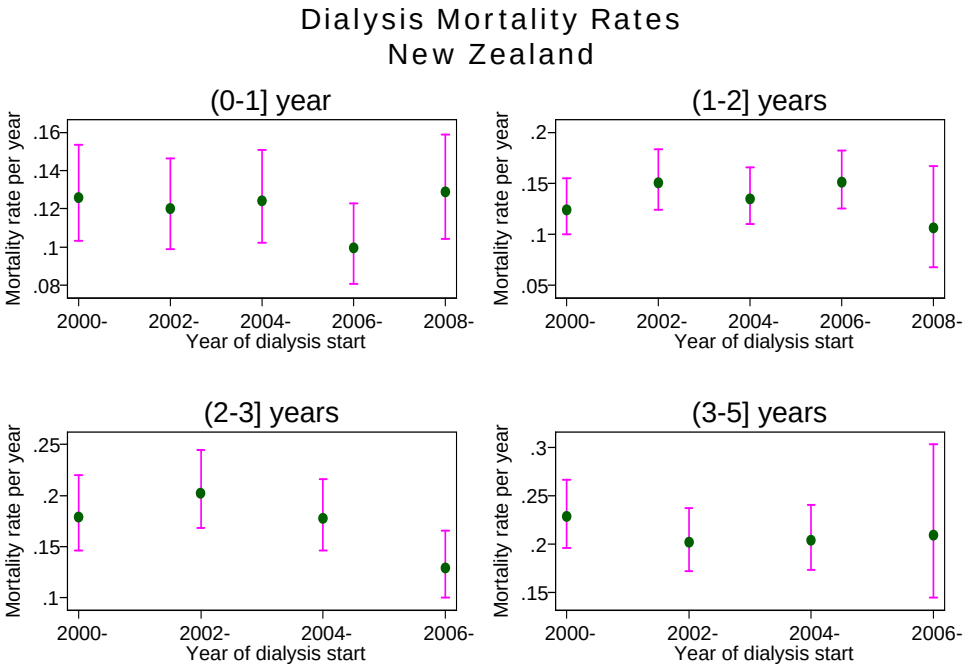
Aust 2009 death and population data from ABS

Figure 3.4



ANZDATA, censored at transplantation
Australia only

Figure 3.5



ANZDATA, censored at transplantation
NZ only

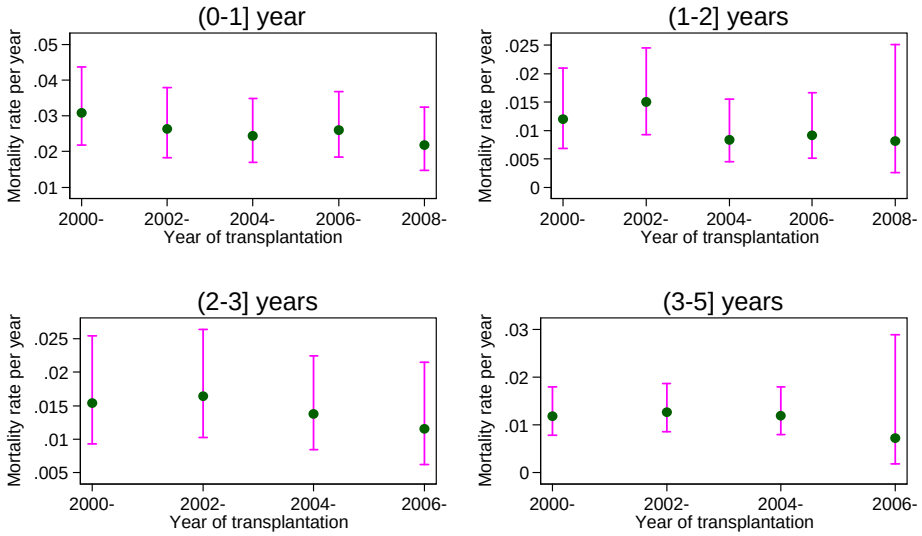
The bracket convention indicates which time points are included or excluded.

For example, (1-2] years indicated that the time periods includes from year 1 up to (but not including) 2 years.

Error bars indicate 95% confidence intervals around point estimates.

Figure 3.6

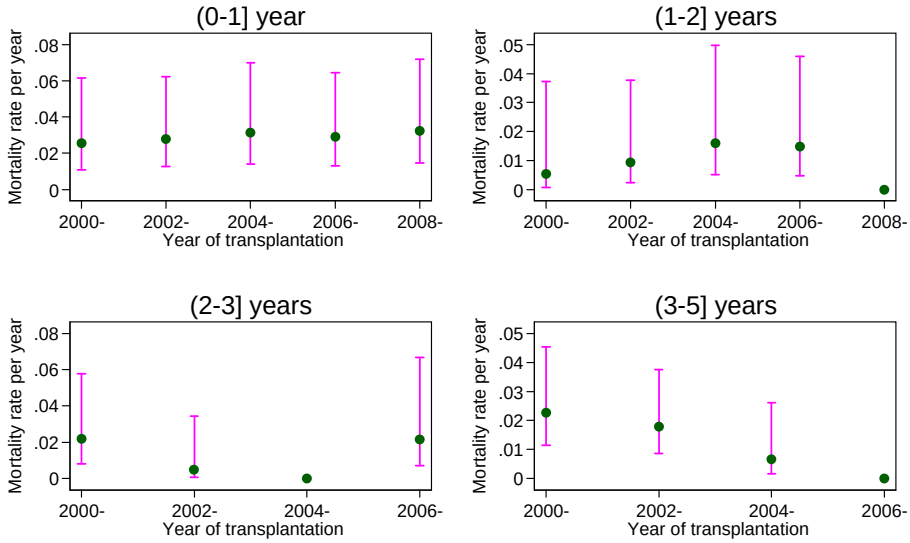
Transplant Recipient Mortality Rates
Australia



ANZDATA, survival of prevalent transplants, Australia only
Includes deaths up to 30 days after transplant failure

Figure 3.7

Transplant Recipient Mortality Rates
New Zealand



ANZDATA, survival of prevalent transplants, NZ only
Includes deaths up to 30 days after transplant failure; some CI not calculated due to small numbers

The bracket convention indicates which time points are included or excluded.

For example, (1-2] years indicated that the time periods includes from year 1 up to (but not including) 2 years.

Error bars indicate 95% confidence intervals around point estimates.

CAUSE OF DEATHS

AUSTRALIA

DIALYSIS DEPENDENT

The most common causes of death were "social causes" (37%), followed by cardiac (34%), infection (12%), vascular and miscellaneous both (9%).

Of the withdrawal of treatment from "social" causes, most were withdrawal related to pyschosocial causes, followed by malignancy, cardiovascular, peripheral vascular, cerebrovascular and access problems. Thirty one percent were diabetics. There were four patients < 40 years of age (the youngest 30 years of age) and 187 patients were ≥ 80 years of age; the oldest was 95 years.

Myocardial infarction (16%) and "cardiac arrest" (15%) formed the majority of the cardiac group.

The site of infection was most commonly reported as "septicaemia", followed by lung, peritoneum, wound and infection in other sites.

The details of the site and identity of the organisms can be found in Appendix II at the Website. (anzdata.org.au/v1/annual_reports_download.html

There were 71 patients (5%) who died from malignancy compared to 92 patients in 2008. A further 92 patients (6%) withdrew from dialysis due to malignancy.

FUNCTIONING TRANSPLANT

Among those with a functioning transplant, malignancy was the most common cause of death (27%), followed by cardiac (23%), then infection (20%), vascular (12%) and "social causes" (8%).

DEATHS OF YOUNG ADULTS

15-24 YEARS OF AGE

There were four deaths in the age group 15-24 years; three males and one female; one male was indigenous. There were two satellite, one home and one hospital haemodialysis dependent. All died from cardiac causes. The youngest was 22 years of age and two had previous failed transplants.

25-34 YEARS OF AGE

There were 19 deaths in this age group; ten females and nine males. Fifteen were caucasoid, two indigenous and one each Indian and Pacific People. Three patients died with a functioning transplant. Fourteen were treated with haemodialysis (eight satellite, six hospital) and one each on home automated peritoneal dialysis and home CAPD. Five of the dialysis patients had previous failed transplants.

Causes of death were: satellite haemodialysis (two from infection, two cardiac and one each from withdrawal, suicide, a coroner's case still pending and unexpected death at home). Hospital haemodialysis (two from infection and one each from withdrawal, malignancy, cardiac causes and a coroner's case still pending).

25-34 YEARS OF AGE (Continued)

Home CAPD and home automated peritoneal dialysis (one CVA and chronic respiratory failure respectively).

The functioning transplant deaths were caused by a motor vehicle accident, withdrawal and infection.

Six patients were diabetic; five were Type 1.

NEW ZEALAND

DIALYSIS DEPENDENT

Cardiac events comprised the most common cause of death (45%). Other causes were "social" (25%), infection (14%), vascular (10%) and miscellaneous (7%).

Treatment withdrawal was reported in 83 patients (25%). Thirty six percent were diabetics. There was only one patient under 40 years of age; the youngest was 34 years and there were nine patients ≥ 80 years of age; the oldest was 88 years.

There were 12 patients (4%) who died from malignancy compared to 25 patients (7%) in 2008. A further 14 patients (4%) withdrew from dialysis in 2009 due to malignancy.

FUNCTIONING TRANSPLANT

Amongst the 34 deaths of patients with a functioning transplant, the causes were malignancy (50%), cardiac (26%), infection (9%) and "social causes" (6%). There were no deaths from vascular causes.

DEATHS OF YOUNG ADULTS

15-24 YEARS OF AGE

Two patients between 15-24 years of age died; one caucasoid and one Maori; both female and both 17 years of age.

One patient was hospital peritoneal dialysis dependent and died from an intra-operative air embolism and the other had a functioning transplant who died from a microglioma.

25-34 YEARS OF AGE

Two patients between 25-34 years of age died: both males and caucasoid.

One was hospital haemodialysis dependent and died from withdrawal due to psychosocial causes and the other a functioning second transplant from cardiac causes. Neither were diabetic.

Figure 3.8

Cause of Death by RRT Modality 1-Jan-2009 to 31-Dec-2009

Cause of Death		Australia		New Zealand	
		Dialysis	Transplant	Dialysis	Transplant
Cardiac	Cardiac arrest	231	11	56	3
	Haemorrhagic Pericarditis	1	-	-	-
	Hyperkalaemia	9	-	-	-
	Hypertensive cardiac failure	3	-	-	1
	Myocardial infarction	116	6	27	2
	Myocardial infarction (presumed)	133	13	58	3
	Other causes of cardiac failure	15	1	5	-
	Pulmonary oedema	7	2	2	-
	Sub Total	**515 (34%)**	**33 (23%)**	**148 (45%)**	**9 (26%)**
Infection	CNS - bacterial	3	1	1	-
	Lung - bacterial	34	9	13	1
	Lung -viral	4 (i) (sf)	3 (cmv)	-	-
	Lung - fungal	2 (as) (ca)	2 (as)	-	-
	Lung - protozoa	-	1 (pn)	-	-
	Lung - other	6 (ni)	1 (ni)	2 (ni)	1 (ni)
	Urinary tract - bacterial	2	-	-	1
	Urinary tract - fungal	1 (ca)	-	-	-
	Wound - bacterial	20	1	-	-
	Wound - fungal	2 (ca)	-	-	-
	Wound - other	1 (ni)	-	-	-
	Shunt - bacterial	4	-	1	-
	Peritoneum - bacterial	23	1	11	-
	Peritoneum - fungal	3 (ca)	-	3 (ca)	-
	Peritoneum - other	-	-	1 (ni)	-
	Septicaemia - bacterial	48	5	3	-
	Septicaemia - fungal	-	2 (cr)	1 (ca)	-
	Septicaemia - other	9 (ni)	-	2 (ni)	-
	Liver - viral	3 (hb)	1 (hb)	1 (hb)	-
	Other site - bacterial	11	-	6	-
	Other site - viral	-	1 (cmv)	-	-
	Other site - other	-	-	1 (ni)	-
	Sub Total	**176 (12%)**	**28 (20%)**	**46 (14%)**	**3 (9%)**
Vascular	Bowel infarction	26	2	4	-
	Cerebrovascular accident	83	11	21	-
	Gastrointestinal haemorrhage	15	-	2	-
	Haemorrhage - dialysis access site	1	-	2	-
	Haemorrhage - elsewhere	6	1	-	-
	Pulmonary embolus	1	-	1	-
	Ruptured aortic aneurysm	5	3	2	-
	Sub Total	**137 (9%)**	**17 (12%)**	**32 (10%)**	**-**
Social	Accident	9	3	-	-
	Patient refused treatment	4	-	-	-
	Suicide	2	2	-	-
	Therapy ceased	9	1	2	-
	Withdrawal - access problems	25	-	-	-
	Withdrawal - cardiovascular	90	-	10	-
	Withdrawal - cerebrovascular	47	-	7	-
	Withdrawal - malignancy	92	1	14	-
	Withdrawal - peripheral vascular	62	-	13	-
	Withdrawal - psychosocial	225	4	38	2
	Sub Total	**565 (37%)**	**11 (8%)**	**83 (25%)**	**2 (6%)**
Miscellaneous	Cachexia	10	3	1	-
	Chronic respiratory failure	11	1	3	-
	Hepatic failure	8	1	1	-
	Malignancy	71	38	12	17
	Other	10	1	2	1
	Pancreatitis	11	1	2	-
	Perforation abdominal viscus	8	-	4	2
	Sclerosing peritonitis	1	-	-	-
	Uraemia caused by graft failure	-	4	-	1
	Unknown	9	2	-	1
	Sub Total	**132 (9%)**	**52 (37%)**	**22 (7%)**	**20 (59%)**
	Total (100%)	**1525**	**141**	**331**	**34**

(as) aspergillus (ca) candida (cmv) cmv (cr) cryptococcus (hb) hepatitis b
(i) influenza (sf) swine flu (pn) pneumocystis (ni) organism not isolated

DEATHS FROM MALIGNANCY

Figure 3.9

Deaths from Malignancy 2009
By RRT Modality at Time of Death

Australia	Dialysis	Transplant	Total
Adenocarcinoma			
Breast	1	-	**1**
Caecum	-	2	**2**
Cholangiole	-	1	**1**
Colon	1	2	**3**
Endometrium	1	-	**1**
Gastrointestinal	1	-	**1**
Kidney	5	1	**6**
Lung	4	1	**5**
Oesophagus	1	1	**2**
Ovary	1	-	**1**
Pancreas	1	-	**1**
Peri-ureteric	1	-	**1**
Primary Unknown	2	-	**2**
Prostate	4	-	**4**
Rectum	-	3	**3**
Stomach	1	-	**1**
Uterus	-	1	**1**
Leukaemia	5	-	**5**
Lymphoma			
Bone Marrow	1	-	**1**
Brain	-	1	**1**
Groin	-	1	**1**
Lung	1	-	**1**
Tonsil	1	-	**1**
Lymphoproliferative			
Brain	-	1	**1**
Neck Nodes	-	1	**1**
Melanoma - Skin	5	3	**8**
Merkel Cell	1	2	**3**
Microglioma	1	-	**1**
Myeloma	13	1	**14**
Squamous Cell Carcinoma			
Anus	1	-	**1**
Lung	3	-	**3**
Palate	-	1	**1**
Skin	1 (*1)	12	**13**
Tongue	2 (*1)	-	**2**
Vulva	1	-	**1**
Transitional Cell Carcinoma			
Bladder	1	-	**1**
Other			
Hepatoma	1	1	**2**
Large Cell - lung	1	-	**1**
Schwannoma - lung	1	-	**1**
Small Cell - Lung	2	1	**3**
Small Cell - Lung and SCC Tongue	1	-	**1**
Unknown - basal ganglia	1	-	**1**
Unknown - colon	1	-	**1**
Unknown - lung	-	1	**1**
Unknown - primary unknown	2	-	**2**
Total Deaths	**71**	**38**	**109**

* (Two patients) had previously been transplanted

AUSTRALIA

During 2009 there were 109 deaths directly due to malignancies (71 among dialysis dependent and 38 among functioning transplant patients). Deaths were attributed by modality at time of death.

DIALYSIS DEPENDENT

Twenty five patients had cancer diagnosed before or within one month of starting their first dialysis. A further eight tumours were identified between two and eight months after the first dialysis.

There were seventeen patients (never transplanted) who had dialysed for more than five years. Two patients had a previous renal transplant.

The myeloma patients had a median survival of 17 months from diagnosis (range <1 - 42 months).

FUNCTIONING TRANSPLANT

There were 38 deaths in 2009 in this group, compared to 54 deaths in 2008.

Twenty one died from non-skin cancer: twelve from adenocarcinoma, two from lymphoma, two from lymphoproliferative disease, one from SCC of the palate, one from multiple myeloma and three from other types of malignancies (hepatoma, small cell of the lung and an unknown primary of the lung).

Seventeen died from skin cancer: twelve from squamous cell carcinoma, three from melanoma and two from Merkel cell.

DEATHS FROM MALIGNANCY

NEW ZEALAND

DIALYSIS DEPENDENT

There were 12 deaths due to malignancy in 2009 compared to 25 in 2008; four patients were diagnosed before or within one month of starting dialysis.

Two patients who were never transplanted had dialysed for five or more years. No patients had a previous renal transplant.

Four were diagnosed with adenocarcinoma, one each with leukaemia, lymphoma, myeloma, SCC of the lung, melanoma and three other types of malignancies (cholangioma of the gall bladder and two primary unknown tumours)

FUNCTIONING TRANSPLANT

There were 17 deaths: eight from squamous cell carcinoma (seven skin and one of the penis), three adenocarcinoma, one microglioma, one TCC of the bladder and four other types of malignancies: one each large cell (lung), mucoepidermoid (salivary gland), myelodysplasia (bone marrow) and sarcoid (prostate).

Figure 3.10

Deaths from Malignancy 2009
By RRT Modality at Time of Death

New Zealand	Dialysis	Transplant	Total
Adenocarcinoma			
Breast	1	-	**1**
Gall Bladder	1	1	**2**
Kidney	1	1	**2**
Primary unknown	1	1	**2**
Leukaemia	1	-	**1**
Lymphoma			
Lymph Nodes	1	-	**1**
Melanoma	1	-	**1**
Microglioma	-	1	**1**
Myeloma	1	-	**1**
Squamous Cell Carcinoma			
Lung	1	-	**1**
Penis	-	1	**1**
Skin	-	7	**7**
TCC			
Bladder	-	1	**1**
Other			
Cholangioma - gall bladder	1	-	**1**
Large Cell - lung	-	1	**1**
Mucoepidermoid - salivary gland	-	1	**1**
Myelodysplasia - bone marrow	-	1	**1**
Sarcoid - prostate	-	1	**1**
Unknown - primary unknown	2	-	**2**
Total Deaths	**12**	**17**	**29**

No dialysis patients were previously transplanted

DEATHS FROM WITHDRAWAL FROM TREATMENT RELATED TO MALIGNANCY

Figure 3.11

Deaths from Withdrawal from Treatment Due to Malignancy 2009

By RRT Modality at Time of Death

Dialysis Dependent	Australia	New Zealand
Adenocarcinoma		
Breast	2	-
Colon	9	-
Colorectal	1	-
Kidney	7	-
Lung	4	1
Oesophagus	1	-
Pancreas	2	-
Primary Unknown	1	
Prostate	4	-
Rectum	1	-
Stomach	2	
Tongue	1	
Uterus	1	
Leukaemia	-	1
Lymphoma		
Multiple Nodes	2	-
Stomach	1	-
Melanoma	1	-
Merkel Cell	2	-
Myeloma	15	5
Squamous Cell Carcinoma		
Floor of Mouth	1	-
(L) Mandible	1	-
(R) Lung	1	-
Skin	2	2
Transitional Cell Carcinoma		-
Bladder	6	1
Kidney	2	-
Urinary System	1	
Other		-
Carcinoid - colon	1	-
Carcinoid - gastro intestinal tract	1	-
Cholangiocarcinoma - pancreas	-	1
Fibrous histiocytoma	1	-
Glioblastoma - brain	1	-
Hepatoma - liver	2	-
Hodgkin's disease	1	-
Leiomyosarcoma - retroperitoneal	1	-
Papillary - thyroid	2	-
Poorly differentiated - small intestine	1	-
Sarcoma - lung	1	-
Small cell - lung	1	-
Unknown - lungs	2	-
Unknown - pancreas	1	-
Unknown - primary unknown	5	1
Unknown - prostate	-	1
Unknown - rectum	-	1
Total Deaths	**92**	**14**

AUSTRALIA

During 2009 there were 92 deaths among dialysis patients attributed to withdrawal from treatment related to malignancy compared to 106 in 2008.

DIALYSIS DEPENDENT

Forty two of the 92 patients had cancer diagnosed before their first dialysis or within two months of commencing treatment. Seven further tumours were identified less than twelve months after the first dialysis.

There were 15 patients (never transplanted) who had dialysed for more than five years. Three patients had dialysed for less than two months and 13 patients had dialysed between two and six months before treatment was withdrawn.

Four patients withdrawing from dialysis treatment had a previous transplant.

There were 36 cases with adenocarcinoma, 15 with myeloma, nine with transitional cell carcinoma, five with squamous cell carcinoma, three with lymphoma, two with Merkel Cell and one with a melanoma. There were 21 other types of malignancies.

The myeloma patients had a median survival from diagnosis of 19.0 months (range 1-66 months).

FUNCTIONING TRANSPLANT

There was one patient in this group in 2009 who had treatment withdrawn due to a lymphoma of the brain.

NEW ZEALAND

DIALYSIS DEPENDENT

Fourteen patients had withdrawal from treatment related to malignancy in 2009.

Eight of the fourteen patients had cancer diagnosed before their first dialysis or within a month of starting treatment.

There were five myeloma, two squamous cell of the skin, one adenocarcinoma of the lung, one leukaemia, one transitional cell carcinoma and four other types of malignancies.

Two patients (never transplanted) had dialysed for more than five years, one patient for less than two months and two patients between two and six months before treatment was withdrawn. Only one had a previous renal transplant.

CHAPTER 4

METHOD AND LOCATION OF DIALYSIS

Nancy Briggs
Leonie Excell
Stephen McDonald

Figure 4.1

Method and Location of Dialysis 2005 - 2009

	Mode of Treatment		2005	2006	2007	2008	2009
Aust	Peritoneal Dialysis	APD	817	991	1151	1273	1293
		CAPD	1043	1056	984	964	884
		Total	**1860**	**2047**	**2135**	**2237**	**2177**
	HD	Hospital	2308	2365	2301	2323	2351
		Home	820	893	949	948	963
		Satellite	3651	3951	4333	4627	4850
		Total	**6779**	**7209**	**7583**	**7898**	**8164**
NZ	Peritoneal Dialysis	APD	185	218	246	288	328
		CAPD	533	548	499	474	462
		Total	**718**	**766**	**745**	**762**	**790**
	HD	Hospital	559	563	613	619	681
		Home	298	322	328	331	369
		Satellite	303	347	383	390	420
		Total	**1160**	**1232**	**1324**	**1340**	**1470**

Figure 4.2

Prevalence of Dialysis Dependent Patients
By State 2005 - 2009
(per Million Population)

	2005	2006	2007	2008	2009
Queensland	1603 (404)	1704 (416)	1808 (432)	1881 (440)	1944 (441)
New South Wales *	2768 (421)	3025 (458)	3188 (477)	3346 (495)	3374 (490)
Aust. Capital Territory *	192 (362)	206 (380)	215 (392)	235 (422)	239 (422)
Victoria	2188 (436)	2345 (457)	2406 (462)	2476 (467)	2513 (463)
Tasmania	156 (321)	163 (333)	175 (355)	179 (359)	194 (386)
South Australia	569 (369)	604 (385)	626 (395)	629 (393)	670 (413)
Northern Territory	316 (1558)	334 (1586)	368 (1712)	397 (1805)	418 (1859)
Western Australia	847 (421)	875 (425)	932 (443)	992 (459)	989 (442)
Australia	**8639 (425)**	**9256 (447)**	**9718 (462)**	**10,135 (474)**	**10,341 (473)**
New Zealand	**1878 (454)**	**1998 (477)**	**2069 (489)**	**2102 (492)**	**2260 (524)**

* NSW population excludes residents of the Southern Area Health Service
* ACT population includes residents of the Southern Area Health Service
(Medical services in the ACT service the Southern Area Region of NSW)

AUSTRALIA

During the past year, there was an increase of 206 (2%) in the total number of prevalent dialysis patients. There were 10,341 patients (473 per million) receiving dialysis treatment at 31st December 2009.

The distribution of these patients across the modalities continues to slowly change (Figures 4.1 and 4.3). The majority (77%) were out of hospital: 30% were dialysing at home and 47% in satellite centres.

The proportion of patients receiving haemodialysis (particularly satellite HD) continues to steadily increase while the proportion receiving peritoneal dialysis (APD and CAPD) decreased by 3% in 2009 after a steady increase over the past years.

Thirteen percent of all prevalent dialysis patients were using automated peritoneal dialysis, a further 9% continuous ambulatory peritoneal dialysis, 23% hospital based haemodialysis, 47% satellite haemodialysis and 9% home haemodialysis.

Automated peritoneal dialysis continues to increase each year, rising 2% in 2009 to 1293 patients. This has been at the expense of continuous ambulatory peritoneal dialysis, which decreased by 8% this year, 2% in 2008 and 7% in 2007.

The overall previous increases in automated peritoneal dialysis were 11% (1273 patients) in 2008, 16% (1151 patients) in 2007 and 21% (991 patients) in 2006.

Satellite haemodialysis increased by 5% in 2009 compared to 7% in 2008 and 10% in 2007.

Forty nine percent of all prevalent dialysis patients were 65 years and older and 360 patients (3%) were 85 years or more, an increase of 15 % in 2009 and 28% in 2008.

AUSTRALIA

The differences with age, dialysis method and location are shown in Appendix II (pages 19-25).

For those <15 years, peritoneal dialysis was used in 76% (74% in 2008), compared to 36% for 15-24 years, 24% for 25-34 years, 21% for 65-84 years and 14% for ≥ 85 years.

The number of patients receiving dialysis treatment rose in all States/Territories except Western Australia in 2009. Tasmania rose by 8%, South Australia 7%, the Northern Territory 5%, Queensland 3% and New South Wales and Victoria both by 1%. Western Australia was lower by only 0.3% (three patients). The number of dialysis patients in relation to population in each State is shown in Figure 4.2.

Relative to State/Territory population, the highest prevalence rate of dialysis patients was in the Northern Territory (1,859 per million), with rates in other States/Territories ranging from 490 per million in New South Wales to 413 per million in South Australia and 386 per million in Tasmania (Figure 4.2).

Figure 4.3

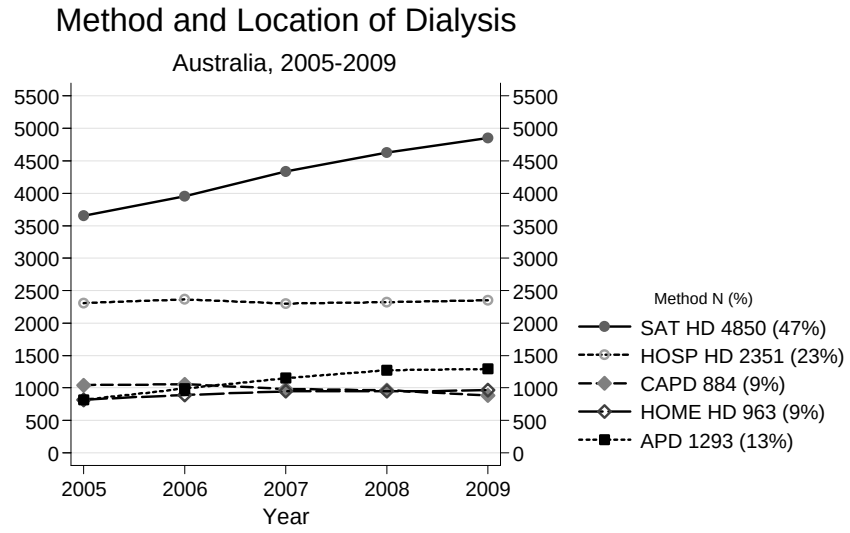
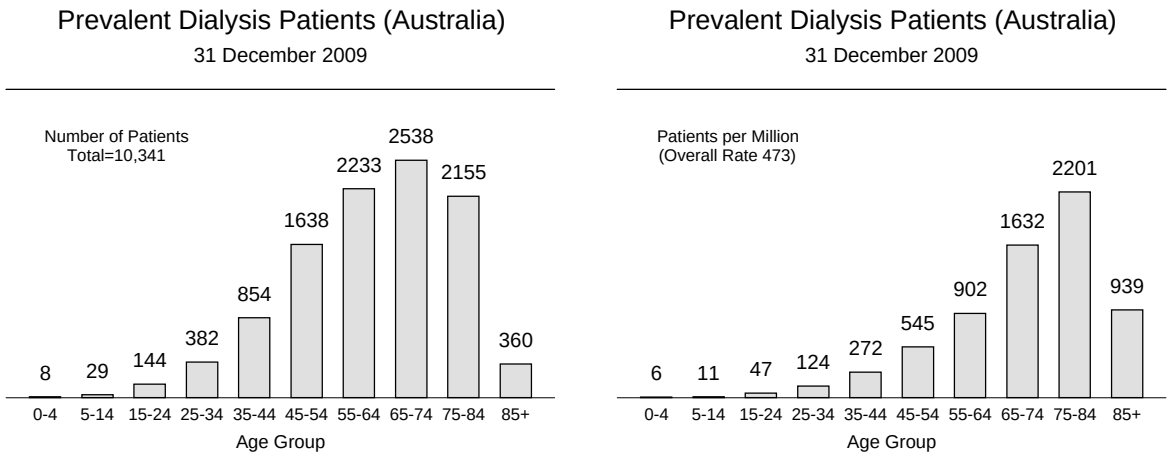


Figure 4.4



NEW ZEALAND (Figures 4.1, 4.2, 4.5 and 4.6)

There was an 8% increase in dialysis patient numbers in 2009 (2,260 patients), after rises of 2% last year and 4% in 2007.

There were increases in seven of the age groups in 2009. The increases ranged from 16% (17 patients) in the 25-34 age group to 3% (two patients) in the 15-24 year age group. The 5-14 year group remained the same. There were decreases in only two of the age groups; 50% (three patients) in the 0-4 year age group and 9% (two patients) in the ≥ 85 year group.

Fifty one percent of patients were treated with a form of home dialysis (of whom 68% were peritoneal dialysis patients). Automated peritoneal dialysis increased 14% in 2009 (328 patients), after increases of 17% in 2008 (288 patients) and 13% (246 patients) in 2007.

In 2009, continuous ambulatory peritoneal dialysis decreased by 3% (462 patients compared to 474 in 2008) following a 5% decrease from 499 patients in 2007.

Together, hospital haemodialysis and satellite dialysis accounted for 49% of patients in 2009, compared to 48% in the previous two years. Satellite haemodialysis numbers increased 8% in 2009 (420 patients), after increases of 2% (390 patients) in 2008 and 10% (383 patients) in 2007.

Figure 4.5

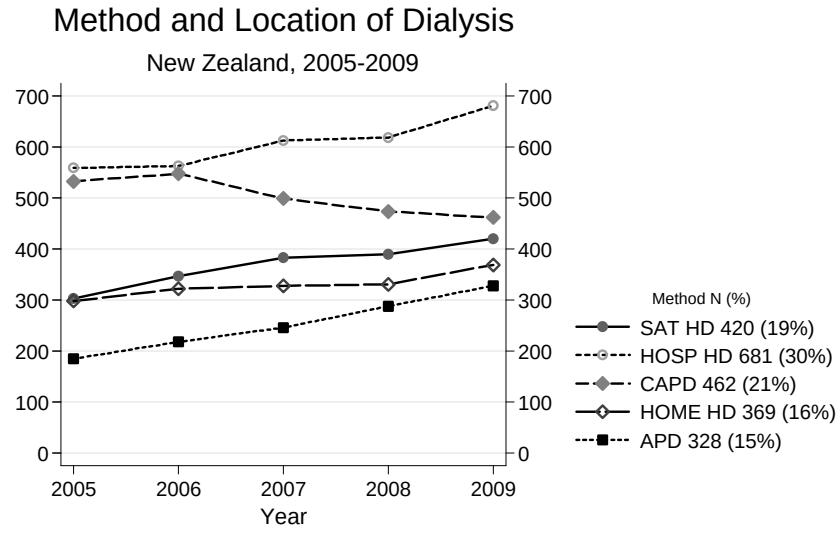
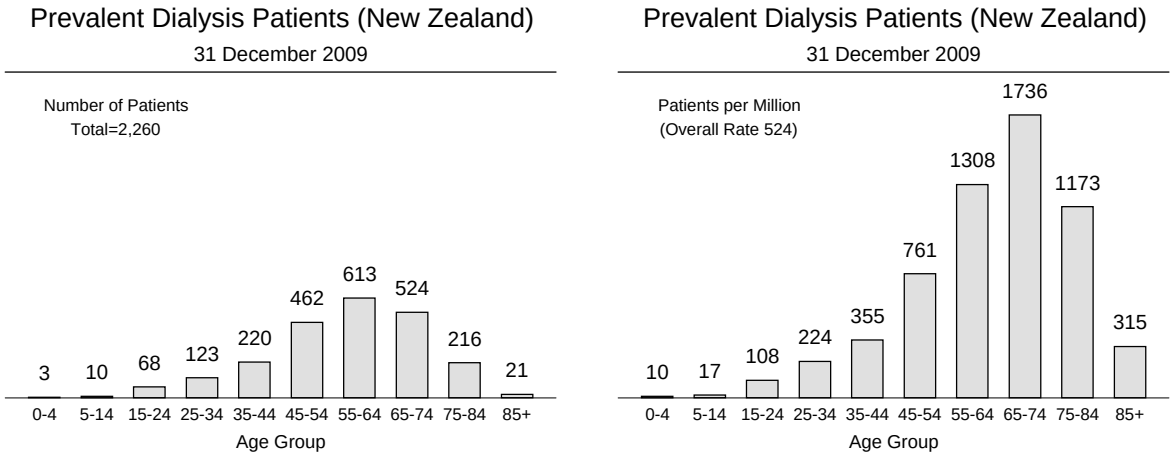


Figure 4.6



CHAPTER 5

HAEMODIALYSIS

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Definitions

CARI guidelines	**Caring for Australasians with Renal Impairment guidelines**
Quotidian HD	**> 3 sessions/week and/or > 5.5 hours/session**
Long Hour HD	**≥ 6.5 hours per HD session**
High Flux Dialyser	**Ultrafiltration coefficient (kuf) >20 ml/hr/mmHg (as specified by the manufacturer)**
AVF	**Native vein arteriovenous fistula**
AVG	**Synthetic arteriovenous bridge graft**
CVC	**Central venous HD catheter (Includes both tunnelled and non-tunnelled unless otherwise stated)**
Obese	**BMI ≥ 30**
Morbid Obe\sity	**BMI ≥ 35**

STOCK AND FLOW

AUSTRALIA

The annual stock and flow of HD patients during the period 2005-2009 is shown in Figures 5.1, 5.2 and 5.3.

There were 8,164 patients (373 per million) receiving HD treatment at 31st December 2009, an increase of 3%; of these 29% were hospital based, 59% were in satellite centres and 12% at home, the same as in 2008.

The proportion of all prevalent dialysis patients who were using home HD in each State was 14% for New South Wales, 12% the ACT, 10% Queensland, 8% Victoria, 7% the Northern Territory, 5% Tasmania, 3% Western Australia and 2% for South Australia. These proportions were lower among older people (Figure 5.6).

A total of 2,001 patients received HD for the first time during the year, a decrease of 6% from 2008, after an increase of 6% from 2007 to 2008.

The proportion of all HD patients in each age group is shown in Figure 5.8. There were 2,064 people ≥ 75 years receiving haemodialysis, including 308 people ≥ 85 years, a rise of 15% from 2008, following a 25% rise for the previous year.

There were 493 transplant operations, an 8% decrease from 2008 (535 operations), representing 6% of all HD patients dialysing and 11% of those patients < 65 years. There were 41 patients aged ≥ 65 years transplanted.

There were 1,217 deaths in 2009 (1,200 in 2008).

For more detail regarding age and mode of HD in each State see Appendix II at the Website (www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm).

Figure 5.1

Stock and Flow of Haemodialysis Patients
2005 - 2009

	2005	2006	2007	2008	2009
Australia					
Patients new to HD	2025	2061	2017	2139	2001
First Dialysis Treatment	1730	1775	1726	1780	1654
Previous Dialysis (PD)	258	254	268	319	309
Failed Transplant	37	32	23	40	38
Transplanted	415	427	405	535	493
Deaths	927	1036	1163	1200	1217
Never Transplanted	859	962	1084	1137	1141
Previous Transplant	68	74	79	63	76
Transfers to Peritoneal Dialysis	489	556	446	506	413
Patients Dialysing (HD) at 31 December	6779	7209	7583	7898	8164
Patients Dialysing (HD) at Home 31 December	820	893	949	948	963
% of all Home Dialysis (HD and PD) Patients	31%	31%	31%	30%	31%
New Zealand					
Patients new to HD	389	408	378	395	417
First Dialysis Treatment	300	328	309	321	348
Previous Dialysis (PD)	74	70	57	66	59
Failed Transplant	15	10	12	8	10
Transplanted	44	51	60	69	61
Deaths	150	181	176	236	205
Never Transplanted	136	166	166	219	192
Previous Transplant	14	15	10	17	13
Transfers to Peritoneal Dialysis	136	190	157	166	115
Patients Dialysing (HD) at 31 December	1160	1232	1324	1340	1470
Patients Dialysing (HD) at Home 31 December	298	322	328	331	369
% of all Home Dialysis (HD and PD) Patients	29%	30%	31%	30%	32%

NEW ZEALAND

The annual stock and flow of HD patients during the period 2005-2009 is shown in Figures 5.1, 5.4 and 5.5.

There were 1,470 patients (341 per million) receiving treatment at 31st December 2009, a 10% increase from 2008, following only a 1% increase from the previous year.

Hospital based HD (46%), satellite HD (29%) and home HD (25%) have all remained the same for the past three years.

New Zealand is continued on page 5-6.

Figure 5.2

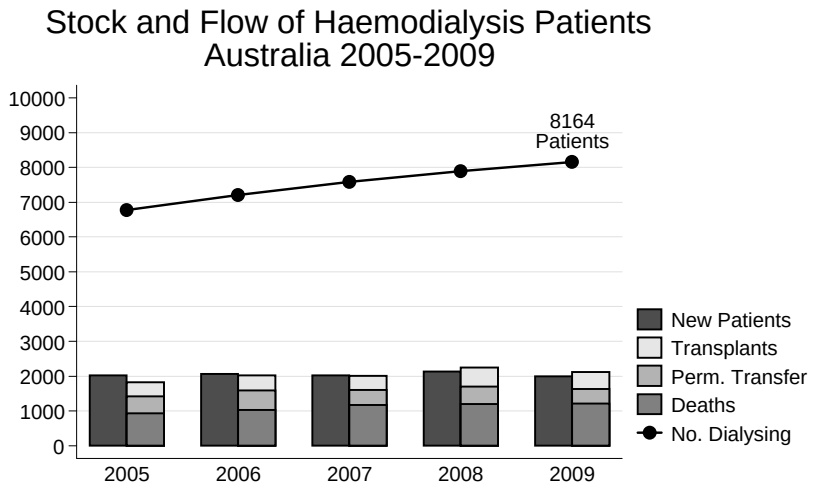


Figure 5.3

Stock and Flow of Haemodialysis Patients
Australia 2005 - 2009 Number (%)

Age Groups	2005	2006	2007	2008	2009
New Patients *					
00-14 years	15 (1%)	13 (1%)	9 (<1%)	13 (1%)	9 (<1%)
15-24 years	41 (2%)	34 (2%)	46 (2%)	42 (2%)	46 (2%)
25-34 years	107 (5%)	78 (4%)	94 (5%)	101 (5%)	84 (4%)
35-44 years	176 (9%)	197 (10%)	187 (9%)	170 (8%)	170 (8%)
45-54 years	316 (16%)	296 (14%)	315 (16%)	344 (16%)	302 (15%)
55-64 years	428 (21%)	454 (22%)	435 (22%)	445 (21%)	433 (22%)
65-74 years	528 (26%)	533 (26%)	484 (24%)	538 (25%)	495 (25%)
75-84 years	377 (19%)	411 (20%)	403 (20%)	429 (20%)	406 (20%)
>=85 years	37 (2%)	45 (2%)	44 (2%)	57 (3%)	56 (3%)
Total	2025 (100%)	2061 (100%)	2017 (100%)	2139 (100%)	2001 (100%)
Patients Dialysing					
00-14 years	7 (<1%)	7 (<1%)	5 (<1%)	10 (<1%)	9 (<1%)
15-25 years	97 (1%)	94 (1%)	98 (1%)	88 (1%)	92 (1%)
25-34 years	351 (5%)	302 (4%)	304 (4%)	290 (4%)	289 (4%)
35-44 years	669 (10%)	696 (10%)	736 (10%)	690 (9%)	685 (8%)
45-54 years	1106 (16%)	1140 (16%)	1208 (16%)	1268 (16%)	1299 (16%)
55-64 years	1427 (21%)	1565 (22%)	1614 (21%)	1713 (22%)	1764 (22%)
65-74 years	1625 (24%)	1753 (24%)	1805 (24%)	1892 (24%)	1962 (24%)
75-84 years	1351 (20%)	1468 (20%)	1600 (21%)	1680 (21%)	1756 (22%)
>=85 years	146 (2%)	184 (3%)	213 (3%)	267 (3%)	308 (4%)
Total	6779 (100%)	7209 (100%)	7583 (100%)	7898 (100%)	8164 (100%)
Primary Renal Disease *					
Glomerulonephritis	475 (23%)	463 (22%)	479 (24%)	460 (22%)	486 (24%)
Analgesic Nephropathy	57 (3%)	48 (2%)	46 (2%)	45 (2%)	36 (2%)
Hypertension	311 (15%)	307 (15%)	320 (16%)	320 (15%)	279 (14%)
Polycystic Disease	146 (7%)	134 (7%)	128 (6%)	126 (6%)	116 (6%)
Reflux Nephropathy	52 (3%)	62 (3%)	56 (3%)	58 (3%)	60 (3%)
Diabetic Nephropathy	637 (31%)	681 (33%)	638 (32%)	741 (35%)	667 (33%)
Miscellaneous	231 (11%)	252 (12%)	217 (11%)	232 (11%)	223 (11%)
Uncertain	116 (6%)	114 (6%)	133 (7%)	157 (7%)	134 (7%)
Total	2025 (100%)	2061 (100%)	2017 (100%)	2139 (100%)	2001 (100%)

* New patients receiving first haemodialysis treatment

Figure 5.4

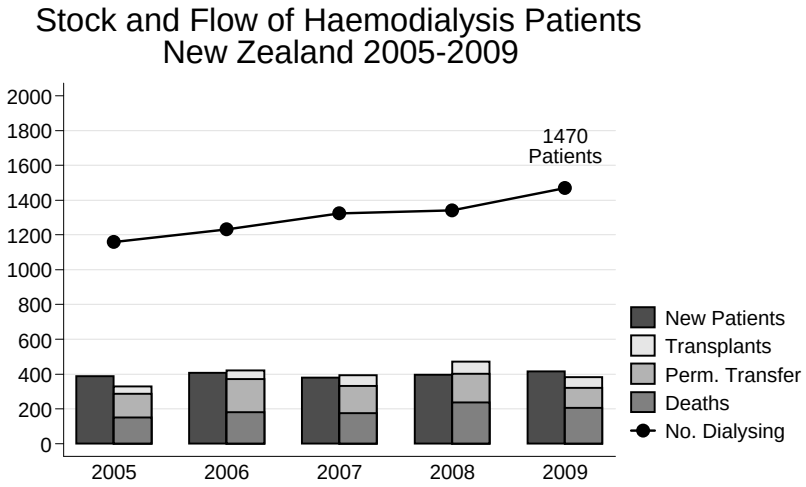


Figure 5.5

Stock and Flow of Haemodialysis Patients
New Zealand 2005 - 2009 Number (%)

Age Groups	2005	2006	2007	2008	2009
New Patients *					
00-14 years	2 (1%)	3 (1%)	3 (1%)	5 (1%)	2 (<1%)
15-24 years	12 (3%)	15 (4%)	21 (6%)	19 (5%)	10 (2%)
25-34 years	14 (4%)	30 (7%)	17 (4%)	15 (4%)	24 (6%)
35-44 years	44 (11%)	33 (8%)	45 (12%)	34 (9%)	51 (12%)
45-54 years	79 (20%)	92 (23%)	63 (17%)	84 (21%)	84 (20%)
55-64 years	120 (31%)	96 (24%)	98 (26%)	117 (30%)	103 (25%)
65-74 years	91 (23%)	95 (23%)	89 (24%)	90 (23%)	89 (21%)
75-84 years	23 (6%)	40 (10%)	38 (10%)	30 (8%)	51 (12%)
>=85 years	4 (1%)	4 (1%)	4 (1%)	1 (<1%)	3 (1%)
Total	389 (100%)	408 (100%)	378 (100%)	395 (100%)	417 (100%)
Patients Dialysing					
00-14 years	2 (<1%)	2 (<1%)	3 (<1%)	3 (<1%)	3 (<1%)
15-25 years	32 (3%)	32 (3%)	39 (3%)	38 (3%)	41 (3%)
25-34 years	82 (7%)	88 (7%)	80 (6%)	76 (6%)	91 (6%)
35-44 years	152 (13%)	150 (12%)	160 (12%)	149 (11%)	161 (11%)
45-54 years	244 (21%)	247 (20%)	261 (20%)	275 (21%)	304 (21%)
55-64 years	325 (28%)	347 (28%)	362 (27%)	373 (28%)	403 (27%)
65-74 years	242 (21%)	270 (22%)	299 (23%)	291 (22%)	311 (21%)
75-84 years	76 (7%)	87 (7%)	107 (8%)	125 (9%)	145 (10%)
>=85 years	5 (<1%)	9 (1%)	13 (1%)	10 (1%)	11 (1%)
Total	1160 (100%)	1232 (100%)	1324 (100%)	1340 (100%)	1470 (100%)
Primary Renal Disease *					
Glomerulonephritis	96 (25%)	92 (23%)	88 (23%)	71 (18%)	94 (23%)
Analgesic Nephropathy	-	1 (<1%)	3 (1%)	1 (<1%)	1 (<1%)
Hypertension	38 (10%)	40 (10%)	44 (12%)	35 (9%)	44 (11%)
Polycystic Disease	29 (7%)	23 (6%)	15 (4%)	14 (4%)	18 (4%)
Reflux Nephropathy	9 (2%)	7 (2%)	8 (2%)	9 (2%)	3 (1%)
Diabetic Nephropathy	161 (41%)	184 (45%)	161 (43%)	204 (52%)	203 (49%)
Miscellaneous	37 (10%)	32 (8%)	47 (12%)	46 (12%)	40 (10%)
Uncertain	19 (5%)	29 (7%)	12 (3%)	15 (4%)	14 (3%)
Total	389 (100%)	408 (100%)	378 (100%)	395 (100%)	417 (100%)

* New patients receiving first haemodialysis treatment

Figure 5.6

Proportion (%) of Prevalent Patients aged ≥ 65 years Treated with Home Haemodialysis 2005 - 2009

State	2005	2006	2007	2008	2009
Queensland	2.5%	3.5%	3.7%	4.3%	4.1%
New South Wales	5.9%	4.9%	5.4%	5.5%	5.3%
Australian Capital Territory	2.5%	4.2%	3.8%	4.4%	5.6%
Victoria	2.0%	2.1%	2.9%	3.6%	3.5%
Tasmania	1.4%	3.0%	2.6%	2.7%	2.4%
South Australia	1.1%	-	-	-	-
Northern Territory	-	2.1%	2.0%	2.0%	2.3%
Western Australia	0.3%	0.3%	-	0.9%	1.1%
Australia	3.1%	3.1%	3.4%	3.8%	3.8%
New Zealand	5.4%	6.6%	8.1%	8.2%	8.5%

Figure 5.7

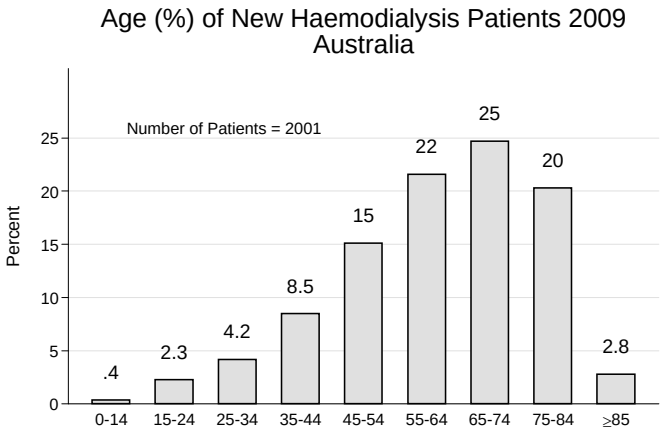
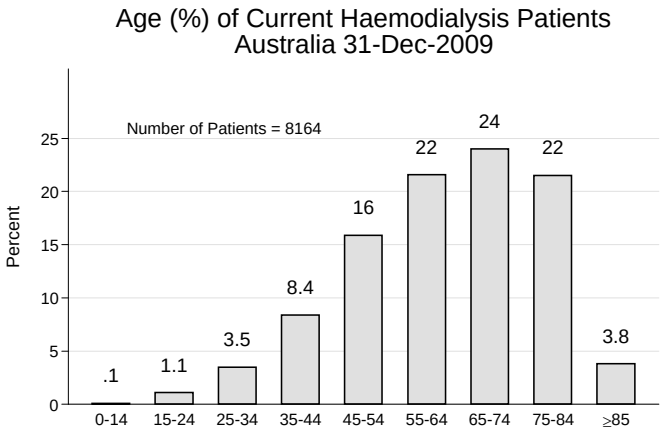


Figure 5.8



NEW ZEALAND (continued from page 5-2)

There were 417 patients who received HD for the first time, a 6% increase in number from 2008, following a 4% increase from the previous year. Eighty three percent were having their initial dialysis treatment, 14% were previously dialysing with peritoneal dialysis and 2% were failed transplants.

The modal age group for new HD patients was 55-64 years (25%), 9% were <35 years and 34% ≥ 65 years (Figures 5.5 and 5.9). The age distribution of the prevalent HD population was 55-64 years (27%), 9% were <35 years and 32% were ≥ 65 years (Figure 5.10).

There were 61 HD patients who received transplants in 2009 (69 in 2008), representing 4% of all HD patients dialysing and 5% of those patients < 65 years. Nine patients ≥ 65 years were transplanted.

There were 205 deaths in 2009 compared to 236 the previous year.

For more details see Appendix III at the Website
(www.anzdata.org.au/ANZDATA/AnzdataReport/download.htm).

Figure 5.9

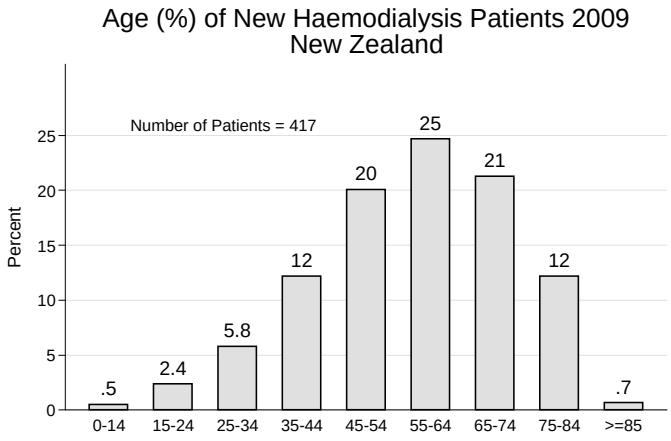
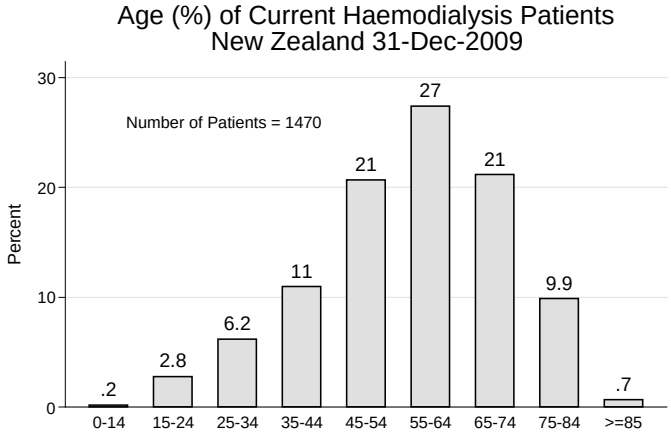


Figure 5.10



AUSTRALIA

Blood flow rates in Australia continued to slowly rise. The proportion receiving a prescribed blood flow rate of 300 mls/minute or higher has risen to 81% in 2009 from 79% in 2008 and 77% in 2007.

Only 4% (338 patients) were prescribed < 250 mls/minute.

Blood flow rates are lower in patients dialysing using central venous catheters than in those using AVFs or AVGs (Figure 5.12).

Figure 5.11

Blood Flow Rates (mls/minute) 2005 - 2009

Country		No. Pts	*	Mls/Minute					
				<200	200-249	250-299	300-349	350-399	>400
Aust	December 2009	8163	1	0.6%	3.6%	14.7%	57.4%	19.7%	4.0%
	December 2008	7898	-	0.7%	4.4%	16.2%	54.8%	20.0%	3.9%
	December 2007	7581	2	0.5%	4.5%	18.4%	53.2%	19.5%	3.9%
	December 2006	7208	1	0.4%	4.5%	19.3%	52.3%	19.1%	4.4%
	December 2005	6779	-	0.6%	4.9%	19.4%	53.3%	18.2%	3.6%
NZ	December 2009	1469	1	0.3%	6.4%	25.3%	45.6%	20.1%	2.3%
	December 2008	1340	-	0.4%	7.5%	31.8%	41.1%	17.2%	1.9%
	December 2007	1324	-	0.5%	6.6%	28.8%	41.1%	21.0%	2.1%
	December 2006	1232	-	0.4%	6.9%	26.3%	44.8%	19.5%	2.1%
	December 2005	1160	-	0.5%	9.5%	23.8%	42.6%	21.6%	2.0%

NEW ZEALAND

In December 2009, 68% of patients were prescribed 300 mls/minute or higher compared to 60% in 2008 and 64% in 2007.

There were 7% (98 patients) using < 250 mls/minute, compared to 8% in 2008 and 7% in 2007; many of these were receiving long hour HD.

Figure 5.12

Blood Flow Rate by Type of Access
December 2009

Blood Flow Rate	Australia			New Zealand		
	AVF	AVG	CVC *	AVF	AVG	CVC
<200	25 (0.4%)	2 (0.3%)	21 (1.8%)	2 (0.2%)	-	2 (0.5%)
200-249	186 (3.0%)	20 (2.6%)	84 (7.3%)	61 (6%)	4 (4.9%)	29 (7.8%)
250-299	778 (12.5%)	120 (15.4%)	306 (26.7%)	170 (16.7%)	38 (46.9%)	163 (44.1%)
300-349	3543 (56.8%)	502 (64.4%)	641 (55.8%)	481 (47.2%)	36 (44.4%)	153 (41.4%)
350-399	1401 (22.5%)	114 (14.6%)	91 (7.9%)	270 (26.5%)	3 (3.7%)	23 (6.2%)
>=400	303 (4.9%)	21 (2.7%)	5 (0.4%)	34 (3.3%)	-	-
Total	6236 (100%)	779 (100%)	1148 (100%)	1018 (100%)	81 (100%)	370 (100%)

* Number of patients having C.V.V. HD not included

Figure 5.13

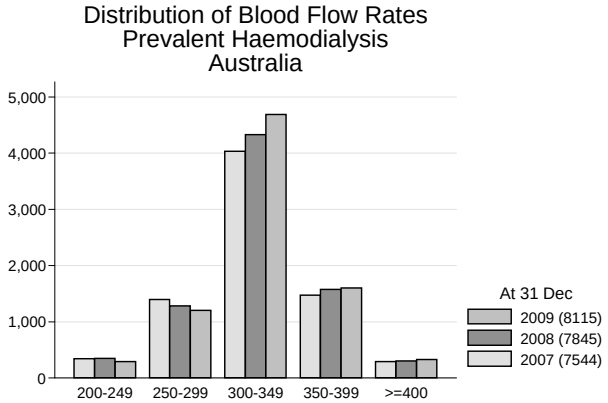


Figure 5.14

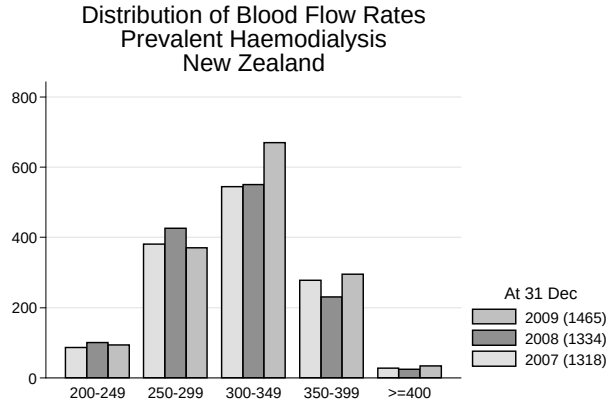
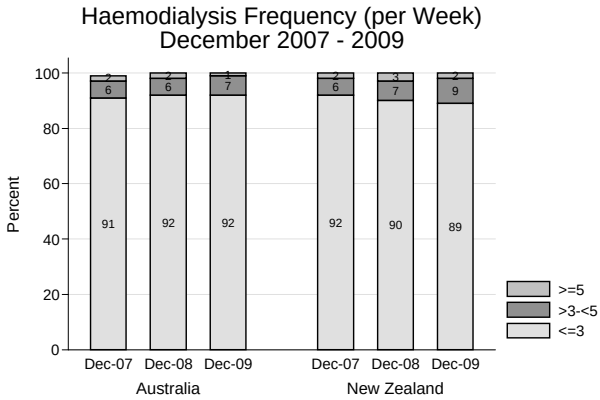


Figure 5.15

Duration and Number of Sessions Per Week
December 2009

Sessions Per week	Hours of Each Treatment						Total
	<4	4	4>4-4.5	>4.5-5	>5-5.5	>5.5	
Australia							
≤ 3	327 (4.4%)	3186 (42.6%)	1547 (20.7%)	2103 (28.1%)	126 (1.7%)	183 (2.4%)	7472 (100%)
3.5-4.5	35 (6.1%)	95 (16.6%)	46 (8.1%)	104 (18.2%)	15 (2.6%)	274 (48.1%)	569 (100%)
≥ 5	60 (49.0%)	25 (20.0%)	1 (0.8%)	3 (2.4%)	2 (1.6%)	31 (25.4%)	122 (100%)
Total	422 (5.2%)	3306 (40.5%)	1594 (19.5%)	2210 (27.1%)	143 (1.8%)	488 (6.0%)	8163 (100%)
New Zealand							
≤ 3	32 (2.4%)	531 (40.4%)	263 (20.0%)	405 (30.8%)	28 (2.1%)	53 (4.0%)	1312 (100%)
3.5-4.5	9 (6.9%)	24 (18.6%)	16 (12.4%)	42 (32.6%)	5 (3.9%)	33 (25.6%)	129 (100%)
≥ 5	7 (25.0%)	10 (35.7%)	3 (10.7%)	4 (14.2%)	2 (7.1%)	2 (7.1%)	28 (100%)
Total	48 (3.3%)	565 (38.5%)	282 (19.2%)	451 (30.7%)	35 (2.4%)	88 (6.0%)	1469 (100%)

Figure 5.16



Frequent and Long Haemodialysis (Figures 5.15 - 5.24)

The proportions of those dialysing > 3 times per week in Australia has plateaued with no change from 2007 to 2009. In New Zealand the proportion dialysing more than three times per week continues to increase. The proportions dialysing ≥ 4.5 hours per session has plateaued as has the total hours per week. As a result, the proportions dialysing more than the "standard" 12 hours per week has now stabilised in both Australia and New Zealand.

In 2009, 56% and 61% of HD patients were dialysing ≥ 13.5 hours per week in Australia and New Zealand respectively.

Figure 5.17

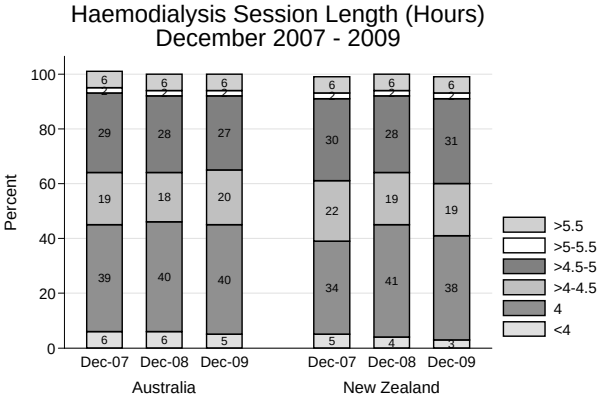


Figure 5.18

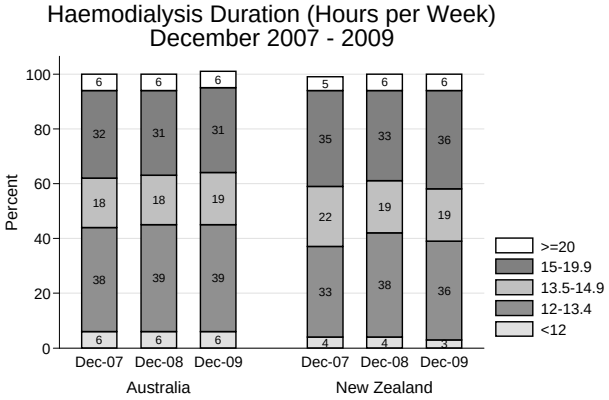


Figure 5.19

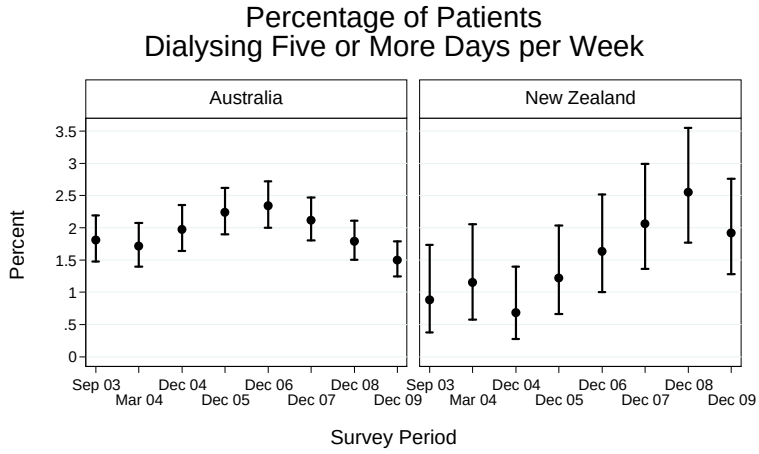


Figure 5.20

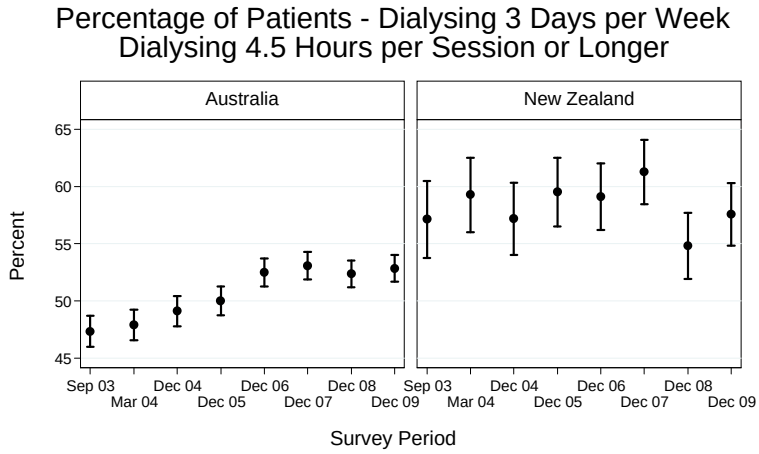
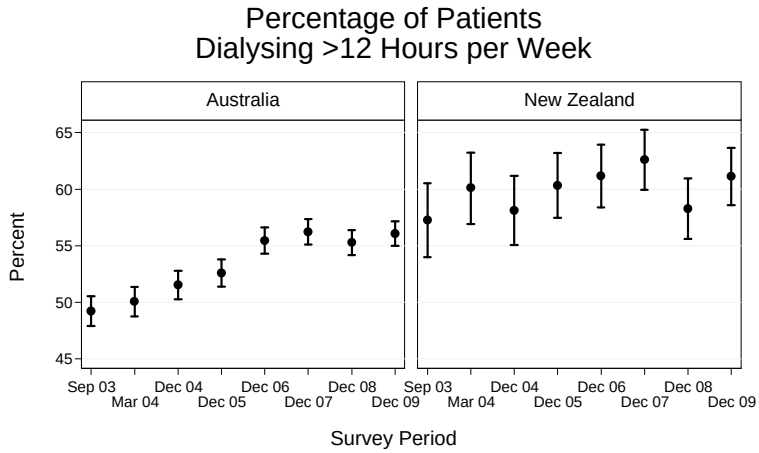


Figure 5.21



Dialysis frequency and session length vary among the Australian States. Patients in Queensland, Victoria and South Australia are more likely to dialyse more frequently, while patients in New South Wales/ACT and the Northern Territory tend to dialyse longer per session on average (Figures 5.22 - 5.25).

Figure 5.22

Haemodialysis Percentage ≥ 5 Sessions per Week
By Australian State and Country

	Australia							New Zealand
	Qld	NSW/ACT	Vic	Tas	SA	NT	WA	
Dec 09	40 (2.6%)	26 (1.0%)	37 (1.8%)	2 (1.4%)	7 (1.3%)	-	10 (1.3%)	28 (1.9%)
Dec 08	51 (3.5%)	25 (1.0%)	45 (2.2%)	2 (1.5%)	10 (2.0%)	1 (0.3%)	12 (1.6%)	34 (2.5%)
Dec 07	59 (4.3%)	25 (1.0%)	52 (2.6%)	1 (0.8%)	9 (1.9%)	-	14 (1.9%)	27 (2.0%)
Dec 06	50 (3.9%)	33 (1.4%)	56 (2.9%)	3 (2.4%)	14 (3.0%)	3 (1.0%)	12 (1.7%)	20 (1.6%)

Figure 5.23

Haemodialysis Percentage ≥ 4.5 Hours Per Session
Three Sessions per Week
By Australian State and Country

	Australia							New Zealand
	Qld	NSW/ACT	Vic	Tas	SA	NT	WA	
Dec-09	777 (58.2%)	1716 (72.5%)	662 (35.0%)	81 (61.4%)	131 (26.2%)	305 (80.7%)	191 (26.7%)	743 (57.4%)
Dec-08	723 (57.7%)	1729 (74.1%)	642 (34.7%)	55 (45.1%)	105 (22.9%)	278 (79.0%)	176 (24.8%)	649 (54.7%)
Dec-07	686 (59.3%)	1676 (74.0%)	613 (34.1%)	46 (40.0%)	121 (27.0%)	279 (85.1%)	186 (27.6%)	732 (61.2%)
Dec-06	620 (56.7%)	1656 (76.0%)	579 (33.3%)	43 (38.4%)	117 (26.8%)	248 (83.8%)	157 (24.2%)	668 (59.1%)

Figure 5.24

Haemodialysis Percentage >12 Hours per Week
By Australian State and Country

	Australia							New Zealand
	Qld	NSW/ACT	Vic	Tas	SA	NT	WA	
Dec-09	951 (61.2%)	1953 (73.4%)	868 (41.1%)	92 (63%)	161 (30.4%)	308 (80.2%)	237 (30.7%)	895 (60.9%)
Dec-08	889 (60.5%)	1944 (74.4%)	839 (40.6%)	64 (47.8%)	131 (26.7%)	285 (78.9%)	215 (28.1%)	779 (58.1%)
Dec-07	854 (62.0%)	1891 (74.7%)	806 (40.2%)	55 (42.6%)	155 (32.1%)	285 (85.1%)	225 (31.3%)	828 (62.5%)
Dec-06	771 (60.0%)	1829 (76.3%)	758 (39.2%)	54 (43.2%)	144 (30.4%)	255 (83.3%)	193 (28.1%)	753 (61.1%)

OUTCOME AMONG HAEMODIALYSIS PATIENTS

In Australia, there has been little change in haemodialysis patient survival over time, after adjusting for age, diabetes status, sex, race and comorbidities.

In New Zealand, recent cohorts have better survival.

In both countries, diabetes status and age have marked effects on haemodialysis patient survival. (Figures 5.25 - 5.35).

Note: For all tables and graphs the times indicated are from the 90th day and not the first treatment.

Figure 5.25

Haemodialysis at 90 Days Patient Survival
Censored for Transplant 1998 - 2009
% [95% Confidence Interval]

	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
1998-2000	2958	93 [92, 94]	87 [86, 88]	66 [64, 67]	50 [48, 52]
2001-2003	3372	93 [92, 93]	87 [86, 88]	65 [64, 67]	46 [44, 48]
2004-2006	4132	93 [92, 93]	87 [86, 88]	64 [63, 66]	46 [44, 48]
2007-2009	4597	93 [92, 94]	87 [86, 88]	66 [62, 69]	-
New Zealand					
1998-2000	410	92 [89, 95]	85 [81, 88]	58 [53, 63]	42 [37, 47]
2001-2003	633	94 [92, 96]	89 [86, 91]	65 [60, 68]	44 [40, 48]
2004-2006	695	95 [93, 96]	87 [85, 90]	67 [63, 70]	46 [41, 51]
2007-2009	755	93 [91, 95]	86 [83, 89]	64 [57, 71]	-

Figure 5.26

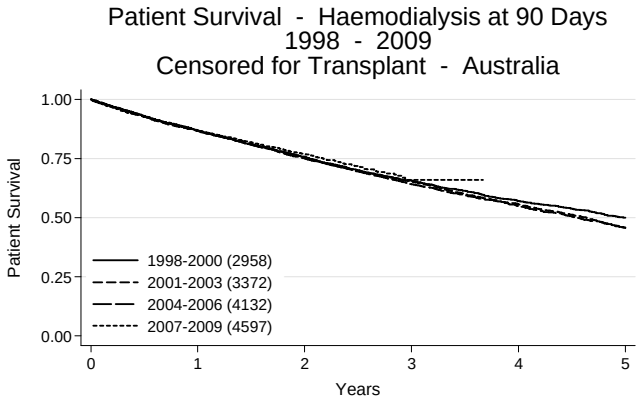
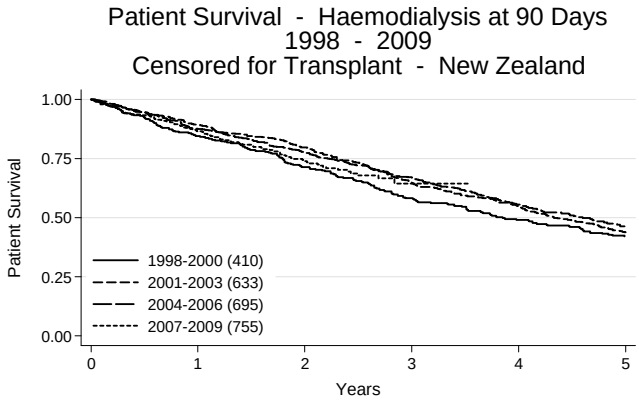


Figure 5.27



Figures 5.28- 5.29

These figures show survival curves for patients treated with haemodialysis at day 90, adjusted to a median age of 63.1 years for Australia and 57.2 years for New Zealand; non-diabetic primary renal disease; caucasoid race; female gender and no comorbid conditions (lung disease, coronary artery disease, peripheral vascular disease or cerebrovascular disease).

Note x axis scale refers to time after day 90. PRD = Primary renal disease.

Figure 5.28

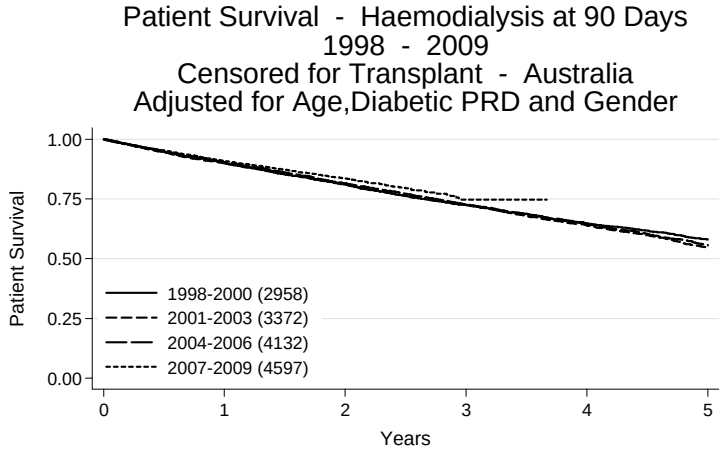


Figure 5.29

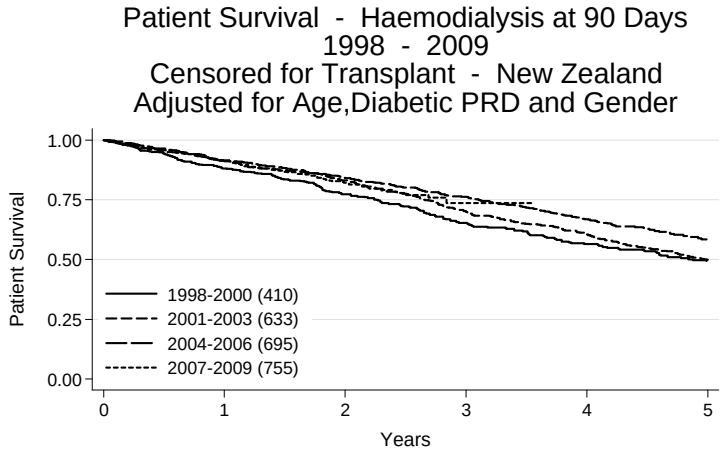


Figure 5.30

Haemodialysis at 90 Days
Patient Survival - Diabetic / Non Diabetic
Censored for Transplant 1998 - 2009
% [95% Confidence Interval]

	Survival			
	6 months	1 year	3 years	5 years
Australia				
Non Diabetic (n=10,622)	93 [92, 93]	87 [86, 88]	67 [66, 68]	50 [48, 51]
Diabetic (n=4437)	93 [93, 94]	86 [85, 87]	61 [60, 63]	42 [40, 44]
New Zealand				
Non Diabetic (n=1372)	94 [92, 95]	87 [85, 89]	67 [64, 70]	51 [48, 55]
Diabetic (n=1121)	94 [92, 95]	87 [85, 89]	60 [57, 64]	37 [33, 40]

Figure 5.31

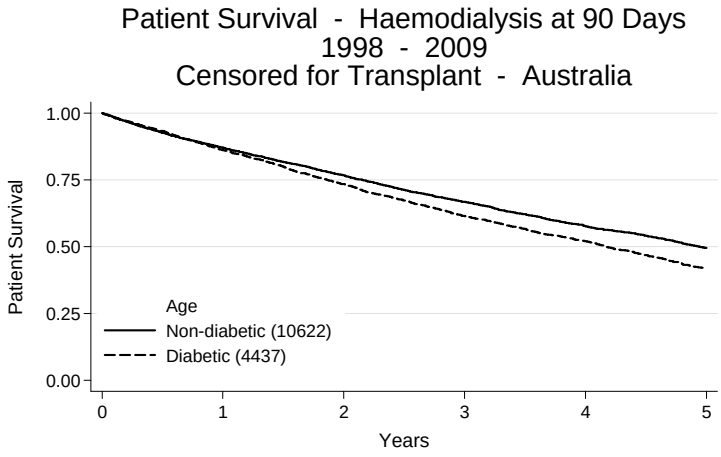


Figure 5.32

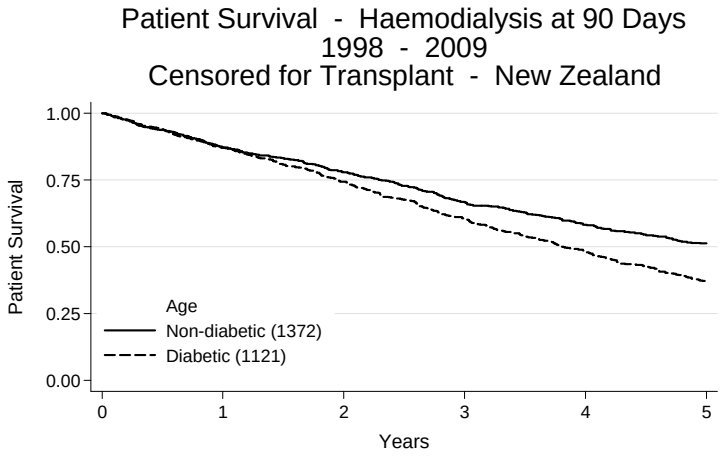
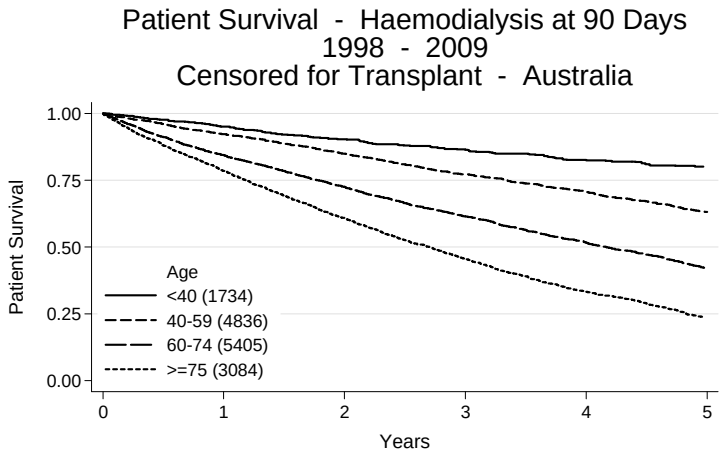


Figure 5.33

Haemodialysis at 90 Days
Patient Survival - By Age Group
Censored for Transplant 1998 - 2009
% [95% Confidence Interval]

Age Groups	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
0-39 years	1734	98 [97, 98]	95 [94, 96]	86 [84, 88]	80 [77, 83]
40-59 years	4836	96 [95, 97]	92 [91, 93]	77 [76, 79]	63 [61, 65]
60-74 years	5405	91 [90, 92]	84 [83, 85]	61 [60, 63]	42 [40, 43]
75 and over	3084	88 [87, 89]	78 [77, 80]	46 [44, 48]	24 [22, 26]
New Zealand					
0-39 years	384	98 [96, 99]	94 [91, 96]	80 [74, 84]	68 [60, 74]
40-59 years	1062	95 [94, 97]	90 [88, 92]	71 [67, 74]	50 [46, 54]
60-74 years	849	91 [89, 93]	85 [82, 87]	56 [53, 60]	36 [32, 40]
75 and over	198	87 [81, 91]	67 [60, 73]	33 [26, 41]	15 [10, 22]

Figure 5.34



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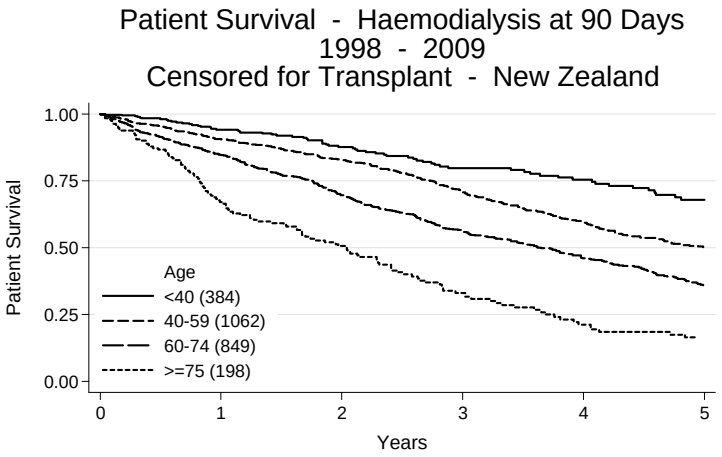


Membrane Type and Surface Areas

Australia Figures 5.36 - 5.38.

Usage of low flux polysulfone dialysers remains at 5% in 2009, (5% in December 2008, 7% in 2007 and 16% in 2006), while the use of high flux polysulphone continues to decrease (1% in 2009, 1.5% in 2008, 7% in both 2007 and 2006, 9% in 2005 and 39% in 2004.

High flux Polysulphone-Helixone increased to 53% in December 2009 from 49% in 2008, 39% in 2007, 34% in 2006 and 27% in 2005. High flux Polyamix increased to 29% this year from 26% last year and 20% in 2007.

There were 88% of patients receiving dialysis with high flux dialysers in 2009 (81% in 2008, 72% in 2007, 64% in 2006 and 57% in 2005).

Six patients were receiving haemofiltration, two each in New South Wales and Western Australia and one each in Queensland and Victoria, and 451/8163 HD patients haemodiafiltration, compared to 285/7903 HD patients in 2008. In 2009 the numbers receiving haemodiafiltration in each State were Queensland (165/1555), New South Wales (169/2449), the ACT (4/213), Victoria (8/2113), Tasmania (34/146), South Australia (38/530, the Northern Territory (0/530) and Western Australia (33/773).

New Zealand Figures 5.36 and 5.38.

Low flux polysulphone decreased to 19% in December 2009, from 24% and 38% in December 2008 and 2007 respectively.

There were 62% (911 patients) reported as receiving dialysis with high flux dialysers in December 2009, an increase from 52% (701patients) in 2008 and 29% (382 patients) in 2007.

There were 148 patients in December 2009, who were receiving haemodiafiltration compared to 160 patients in 2008. There were no patients having haemofiltration.

Figure 5.36

Haemodialyser Membrane Types

Dialyser Membrane Type	Flux	Square Metres					Total
		<1.0	1.0-1.4	1.5-1.7	1.8-1.9	>1.9	
Australia							
Cellulose Acetate	Low	-	-	1	-	2	3
Cellulose Triacetate	High	-	-	1	9	66	76
Diacetate	Low	-	-	9	-	5	14
Polyamix	High	1	51	760	-	1559	2371
Polyamix	Low	-	22	283	-	289	594
Polyethersulfone	High	-	-	5	104	228	337
Polynephron	High	-	-	-	-	1	1
Polysulphone	High	-	18	-	34	22	74
Polysulphone	Low	5	22	-	156	200	383
Polysulphone-Helixone	High	-	808	-	2754	746	4308
Polysynthane	Low	-	-	-	-	2	2
Total		**6**	**921**	**1059**	**3057**	**3120**	**8163**
New Zealand							
Polyamix	High	-	2	52	-	317	371
Polyamix	Low	-	4	90	-	178	272
Polysulphone	High	-	5	-	60	-	65
Polysulphone	Low	1	11	-	134	140	286
Polysulphone-Helixone	High	-	364	-	107	4	475
Total		**1**	**386**	**142**	**301**	**639**	**1469**

Figure 5.37

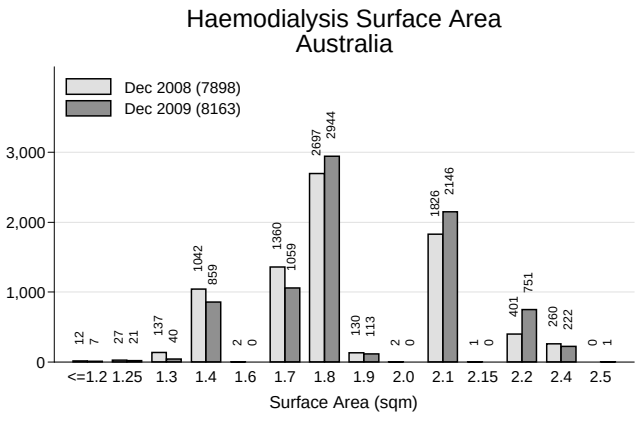
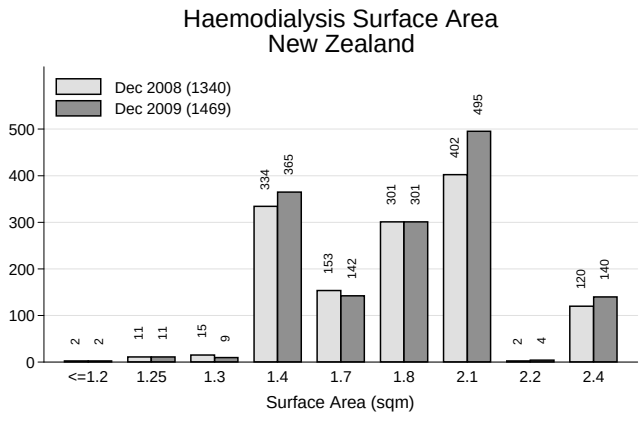


Figure 5.38



ANAEMIA

In Australia, mean haemoglobin and erythropoietic agent use has stabilised. Haemodialysis patients had a higher erythropoietic agent usage despite a similar mean haemoglobin compared to peritoneal dialysis patients (Figures 5.39 - 5.40).

In New Zealand, mean haemoglobin has stabilised at 114 g/L. The increase in erythropoietic agent usage seen over 2003-2005 has reached a plateau.

Figure 5.39

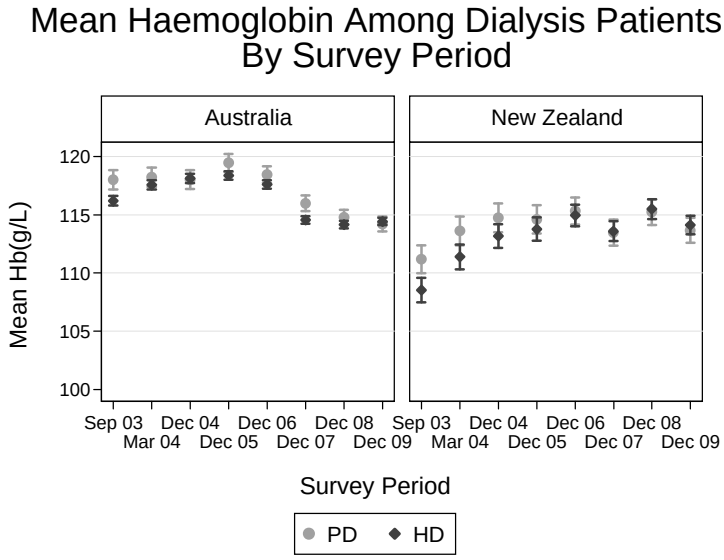
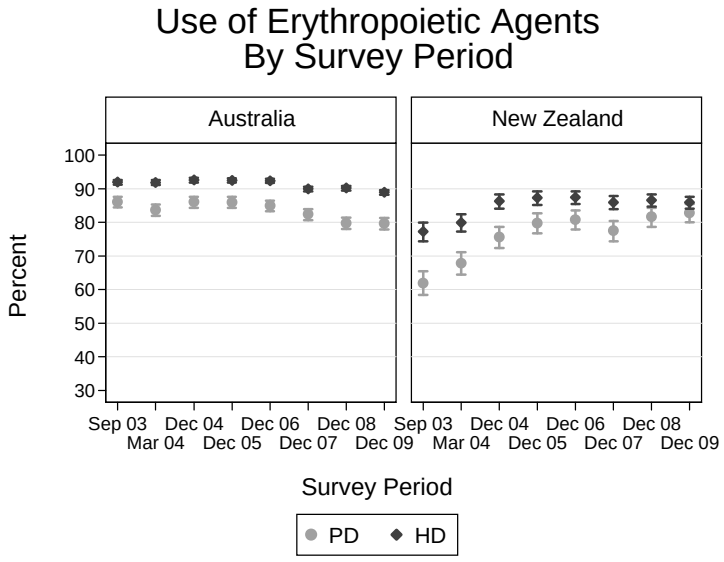


Figure 5.40



HAEMOGLOBIN

In Australia, haemoglobin is <110 g/L in 35% and ≥140g/L in 4% of haemodialysis patients, which is the same as the previous two years.

In New Zealand, the corresponding percentages are 38% and 5% respectively.

Figure 5.42 shows the proportion of patients with proven or likely cardiovascular disease reported as a comorbidity to the Registry, achieving the clinical target of haemoglobin ≤ 120 g/L.

Figure 5.41

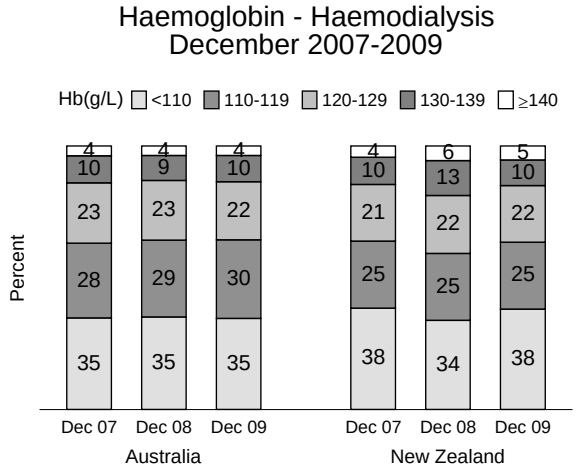
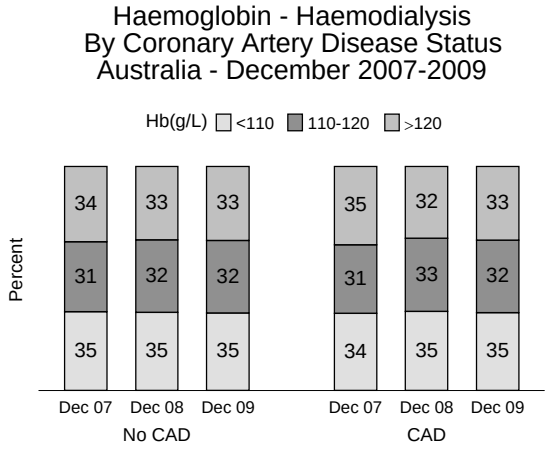
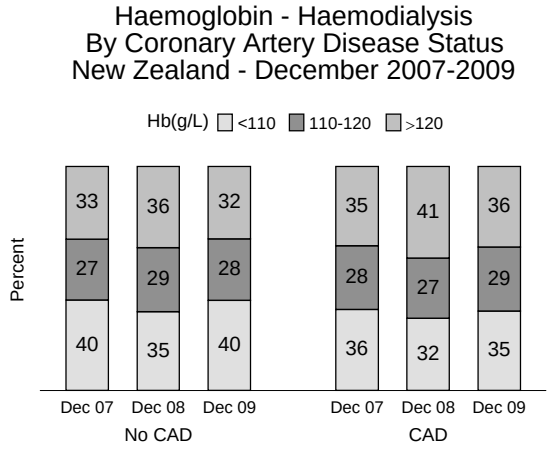


Figure 5.42





HAEMOGLOBIN BY TREATING CENTRE

Figures 5.43 - 5.46

These figures show the median haemoglobin (with inter-quartile range) for individual centres, arranged from lowest to highest. Also shown are the proportion of patients in each centre with a haemoglobin of 110-129 g/L.

In Australia, median haemoglobin for each centre ranged from 105 to 125 g/L for haemodialysis patients and in New Zealand 107-118 g/L.

The proportion of patients in Australia with a haemoglobin of 110-129 g/L in each centre ranged from 32% to 79% for haemodialysis patients and for New Zealand 35% to 59%.

Figure 5.43

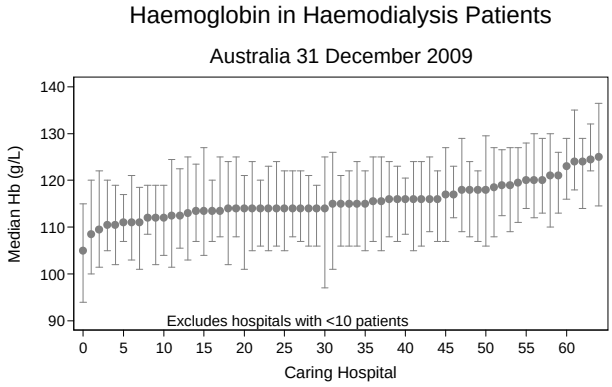


Figure 5.44

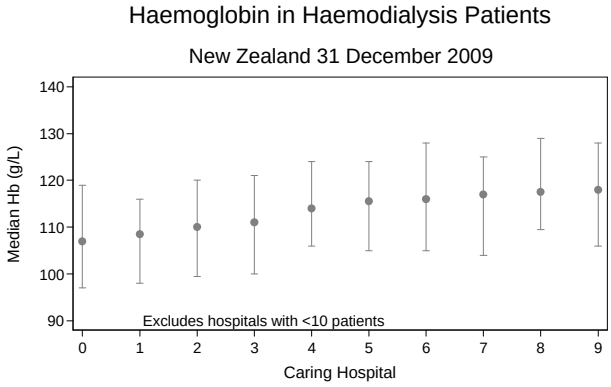


Figure 5.45

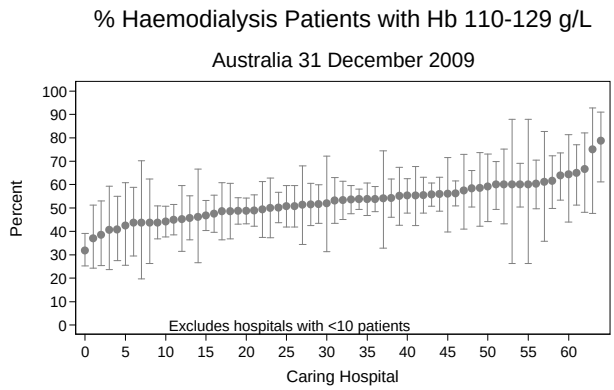
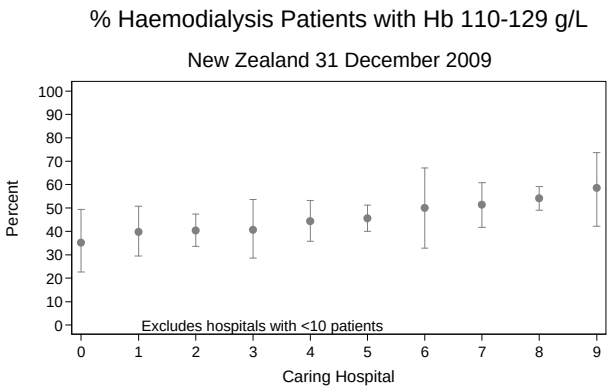


Figure 5.46



FERRITIN AND TRANSFERRIN SATURATION

Figures 5.47 - 5.48

In Australia and New Zealand the proportions of haemodialysis patients with ferritin <200 mcg/L and those with ferritin ≥ 500 mcg/L have been relatively stable.

In both Australia distributions of transferrin saturation have been unchanged for the past three years, while in New Zealand the proportion with a transferrin saturation <20 has reduced.

Figure 5.47

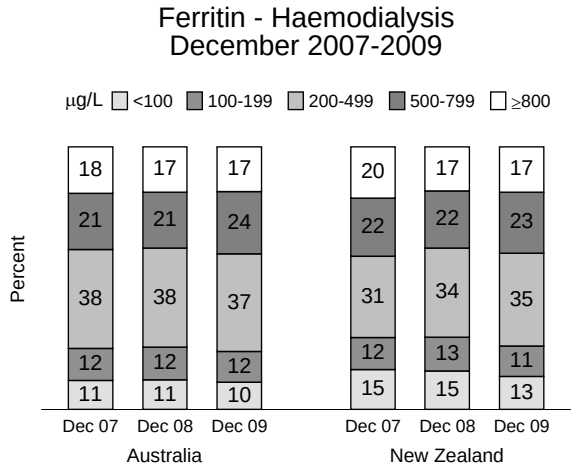
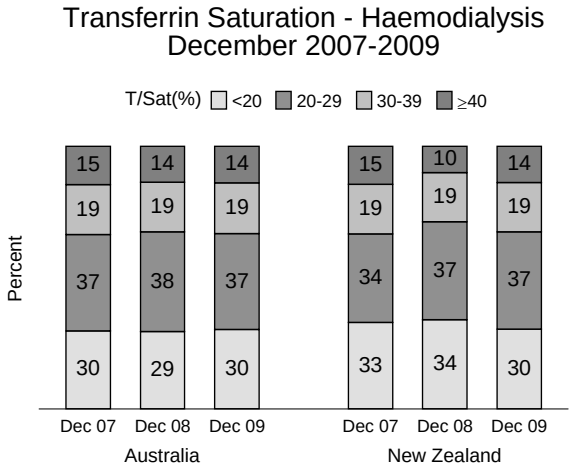


Figure 5.48



FERRITIN BY TREATING CENTRE

Figures 5.49 - 5.52

These figures show the proportions of patients in each centre with ferritin of 200-500 mcg/L and transferrin saturation of >20% respectively, as recommended by the CARI guidelines.

In Australia, the proportions of patients with ferritin within this range in each centre varied widely between 2-80% for haemodialysis patients. Similarly large variations between centres were seen for transferrin saturation, between 33-100%. Again, this large variation probably reflects differences in practices, protocols and patient case-mix among centres.

In New Zealand, the corresponding figures for ferritin were between 17-54% for haemodialysis patients and the corresponding figures for transferrin saturation were between 48-83%. In both countries, significant proportions of patients did not have ferritin and transferrin saturation within the recommended ranges, even in the "best performing" centres.

Figure 5.49

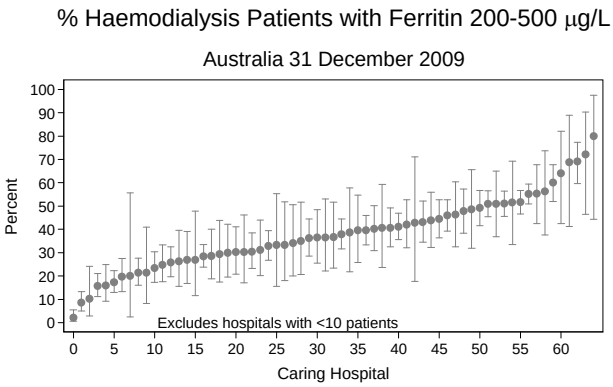
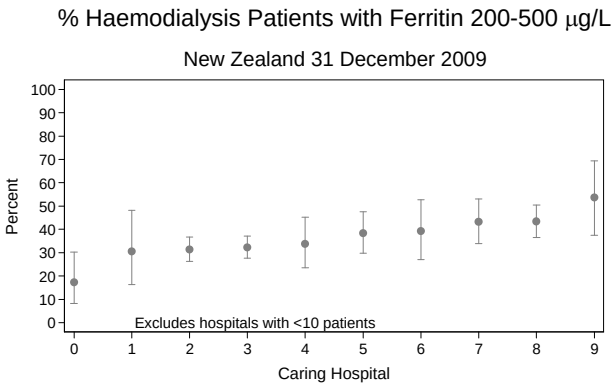


Figure 5.50



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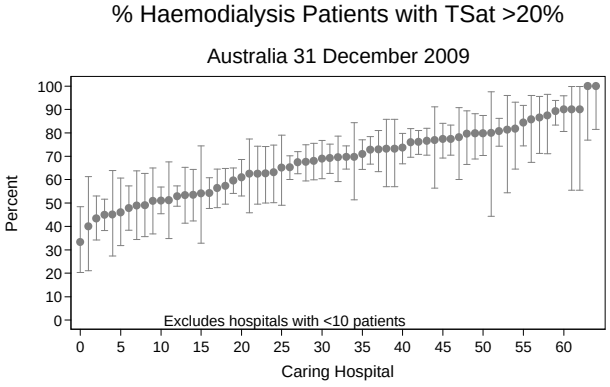
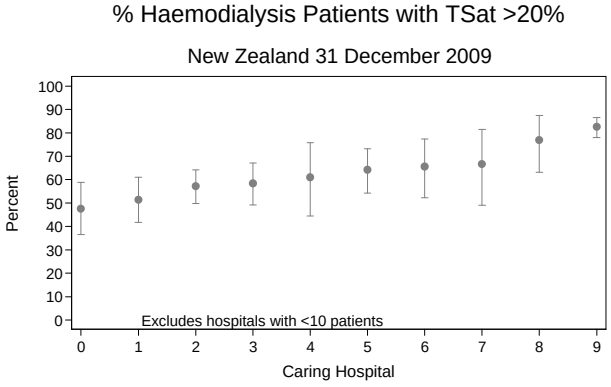


Figure 5.52

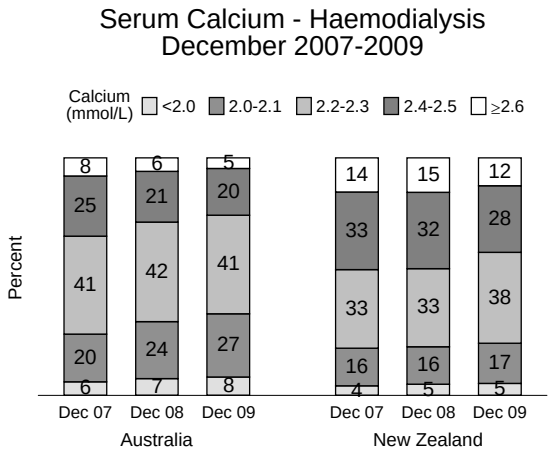


SERUM CALCIUM

Figure 5.53

In both Australia and New Zealand the proportions of patients with proportions with serum calcium ≥ 2.4 mmol/L has continued to decrease, while those with < 2.2 mmol/L have increased in Australia, but remained fairly stable in New Zealand.

Figure 5.53



SERUM CALCIUM BY TREATING CENTRE

Figures 5.54 and 5.55 show the proportions of patients at each centre with serum calcium 2.1-2.4 mmol/L, as recommended by the CARI guidelines. Note however that the values in the guidelines were for corrected total calcium, while those in this report are for uncorrected total calcium.

In Australia, the proportions ranged widely between 10-79% for haemodialysis patients, while in New Zealand the corresponding proportions were 47-78%.

Figure 5.54

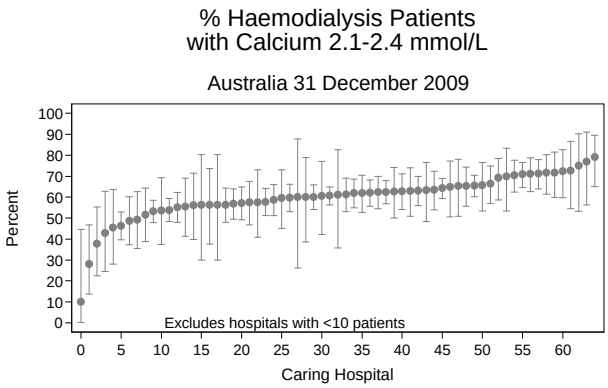
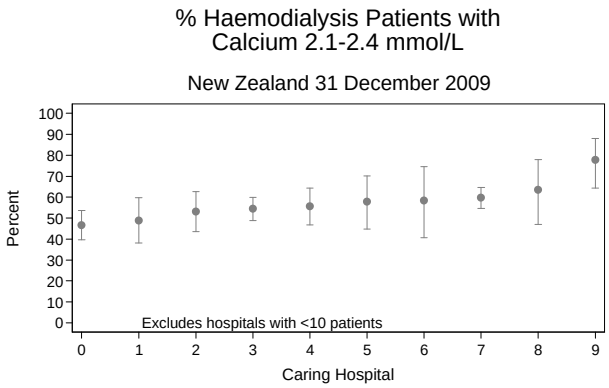


Figure 5.55

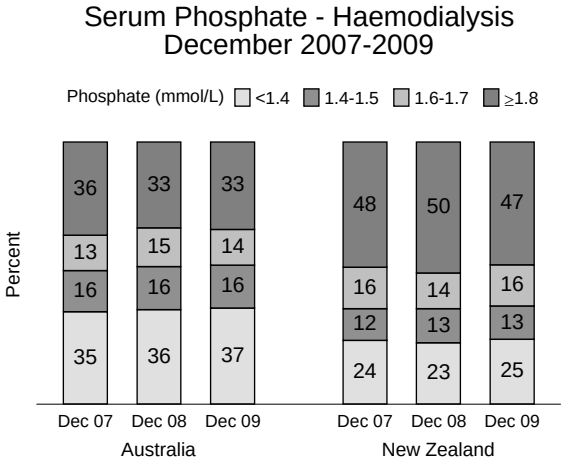


SERUM PHOSPHATE

Figure 5.56

In Australia, the control of serum phosphate has stabilised after a period of steady improvements. In New Zealand, the proportion with serum phosphate > 1.8 has largely remained stable.

Figure 5.56



SERUM PHOSPHATE BY TREATING CENTRE

Figures 5.57 - 5.58 show the proportions of patients at each centre with serum phosphate 0.8-1.6 mmol/L, as recommended by the CARI guidelines.

In Australia, the proportions ranged widely between 37-70% for haemodialysis patients and in New Zealand, the corresponding proportions were 29-51%.

Figure 5.57

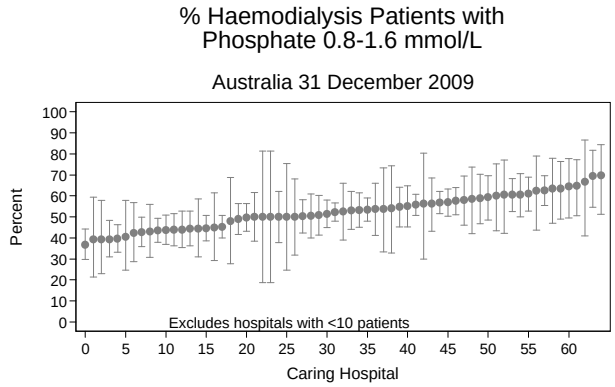
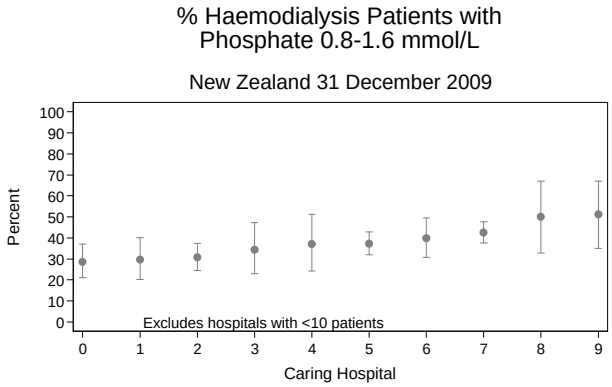


Figure 5.58



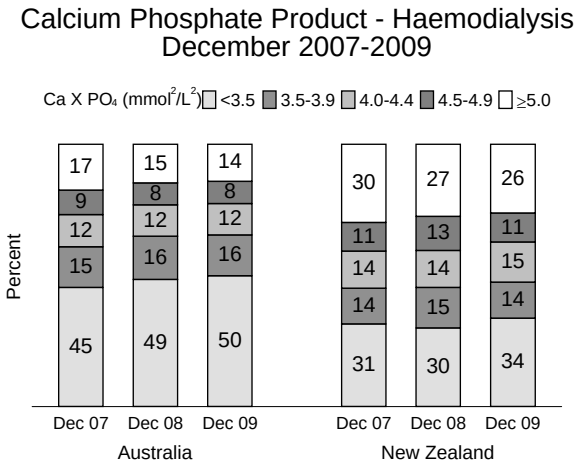
CALCIUM-PHOSPHATE PRODUCT

Figure 5.59

In both Australia and New Zealand, calcium-phosphate product has continued to improve, among haemodialysis patients, with smaller proportions of patients with a product ≥ 5.0 mmol^2/l$^{2.}$

Overall, the proportion of people with high calcium-phosphate product was substantially higher in New Zealand than Australia.

Figure 5.59



CALCIUM-PHOSPHATE PRODUCT BY TREATING CENTRE

Figures 5.60 - 5.61 show the proportions of patients at each centre with calcium-phosphate product <4.0 mmol^2/L^2, as recommended by the CARI guidelines.

In Australia, the proportions ranged widely between 39-87% for haemodialysis patients while in New Zealand, the corresponding proportions were 36-68%.

Figure 5.60

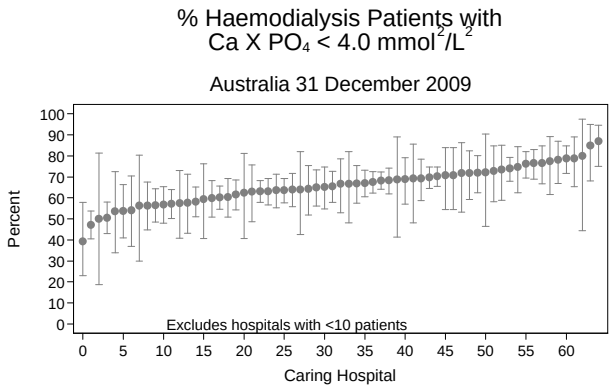
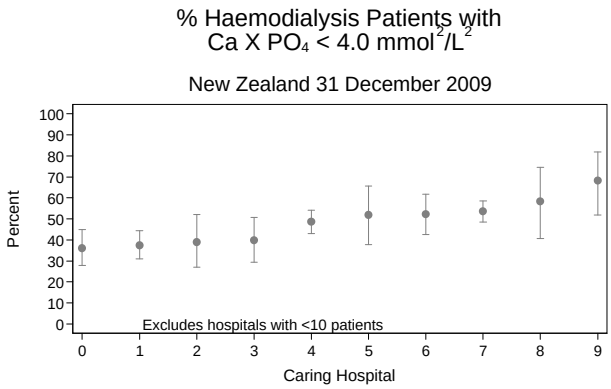


Figure 5.61



UREA REDUCTION RATIO

Figures 5.62 and 5.64

Distributions of URR values have been fairly stable over the past three years. About 9% and 31% of patients on haemodialysis three times a week have URR <65% in Australia and New Zealand respectively.

URR is highest in patients dialysing with an AV graft and lowest in those using catheters (Figure 5.63).

Of those with URR < 65%, 24% in Australia and 30% in New Zealand had CVC access.

Figure 5.62

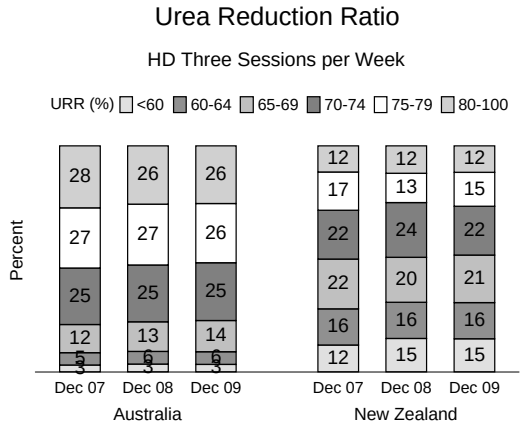


Figure 5.63

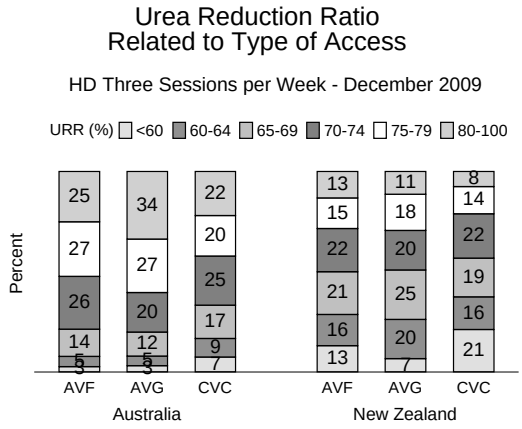


Figure 5.64

Urea Reduction Ratio - Prevalent Patients
Three Sessions per Week - December 2009

Hours per Session	Urea Reduction Ratio %		
	< 65	>=65	Total
Australia			
<4 hours	42 (15.6%)	227 (84.4%)	269 (100%)
4 hours	256 (8.9%)	2606 (91.1%)	2862 (100%)
>4-5 hours	274 (8.1%)	3092 (91.9%)	3366 (100%)
>5 hours	27 (11.9%)	200 (88.1%)	227 (100%)
Total	599 (8.9%)	6125 (91.1%)	6724 (100%)
New Zealand			
<4 hours	11 (44.0%)	14 (56.0%)	25 (100%)
4 hours	143 (31.4%)	313 (68.6%)	456 (100%)
>4-5 hours	167 (29.5%)	399 (70.5%)	566 (100%)
>5 hours	15 (26.3%)	42 (73.7%)	57 (100%)
Total	336 (30.4%)	768 (69.6%)	1104 (100%)

UREA REDUCTION RATIO BY TREATING CENTRE

Figures 5.65 and 5.66 show the median URR in each hospital and Figures 5.67 and 5.68 show the proportions of haemodialysis patients dialysing three times per week in each hospital with URR > 70%, the target recommended by the CARI guidelines.

Median URR values in the respective countries did not vary greatly: 65-85% in Australia and 67-78% in New Zealand. However, the proportions with URR >70% in each unit varied widely, from 28-96% in Australia and 29-81% in New Zealand.

Figure 5.65

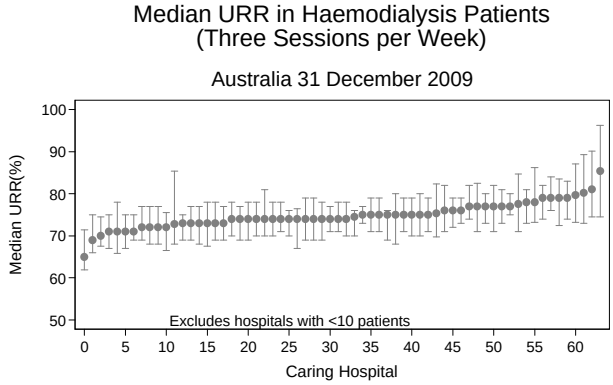


Figure 5.66

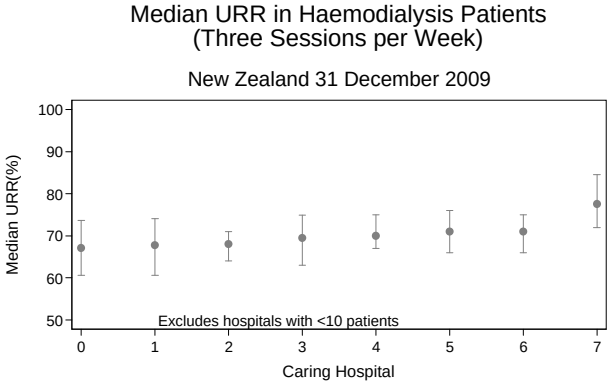


Figure 5.67

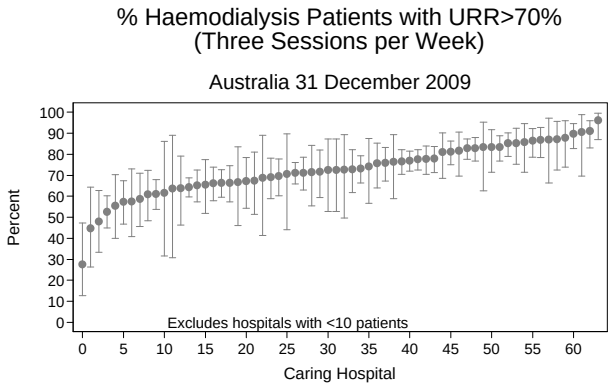
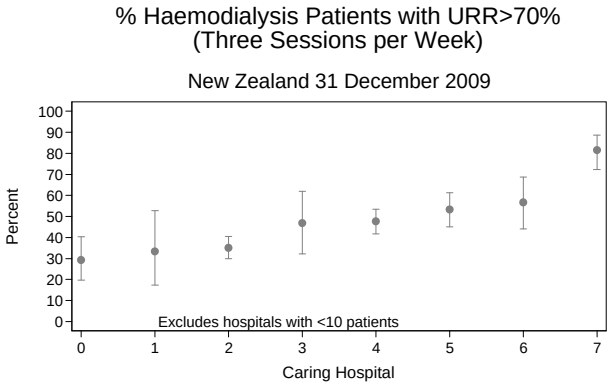


Figure 5.68



VASCULAR ACCESS AT FIRST TREATMENT

Figures 5.69 to 5.78

The proportion of patients starting haemodialysis with an AVF has continued to rise in both Australia and New Zealand although the majority of patients commence with a catheter.

In Australia, tunnelled catheters were more common than non-tunnelled, but the reverse was true in New Zealand.

Diabetic, female, young (age <25years) patients and patients who were first seen by nephrologists < 3 months before starting haemodialysis ("late referrals") were less likely to start with an AVF or AVG.

In both Australian and New Zealand indigenous peoples had similar or increased rates of AVF or AVG at the commencement of dialysis.

ANZDATA does not collect information about indication for catheter usage, hence the reason less than half of non-late referred patients commence is not known.

Figure 5.69

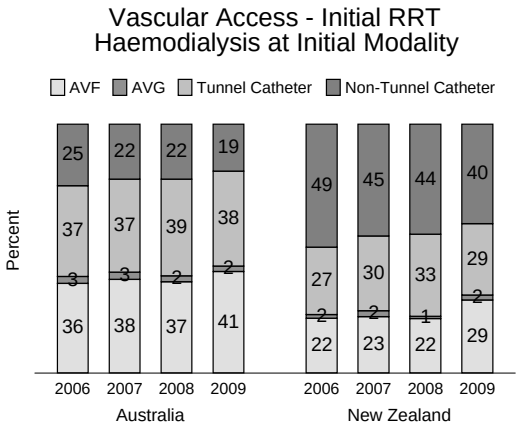


Figure 5.70

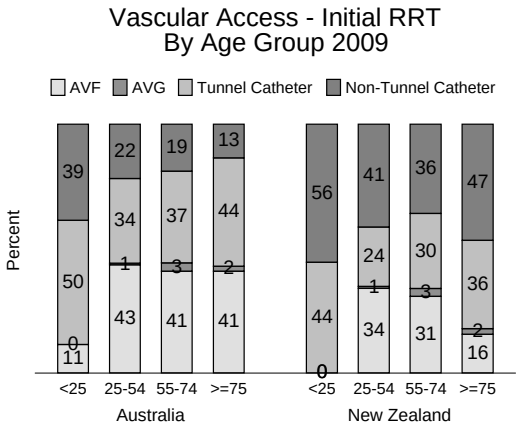


Figure 5.71

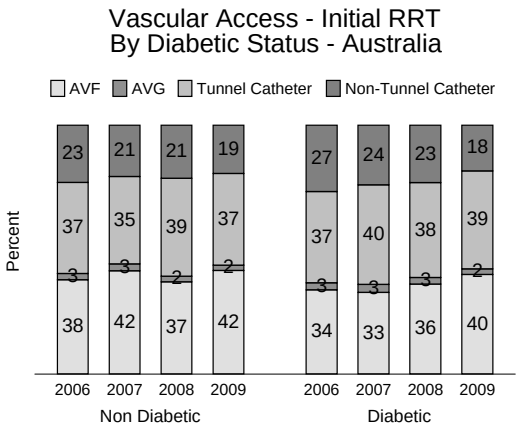
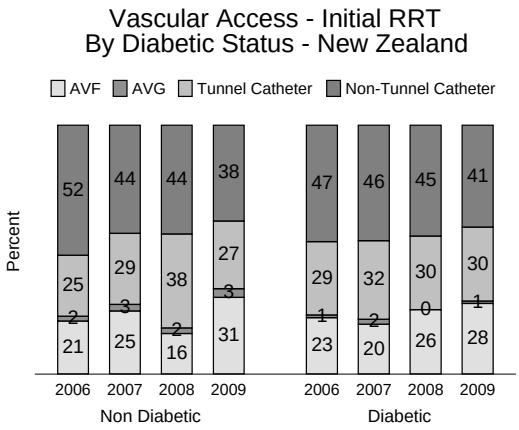


Figure 5.72



VASCULAR ACCESS AT FIRST TREATMENT

Figure 5.73

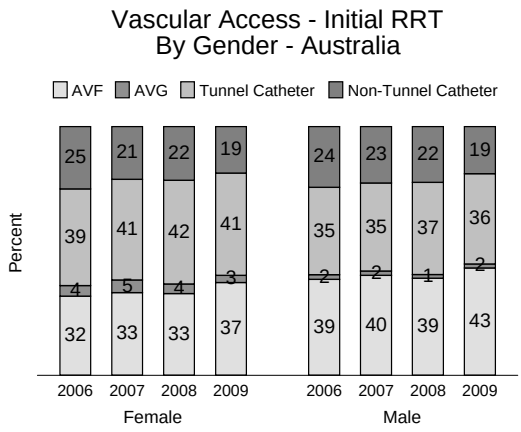


Figure 5.74

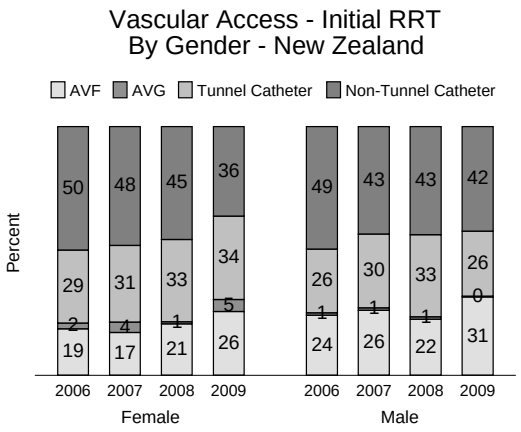


Figure 5.75

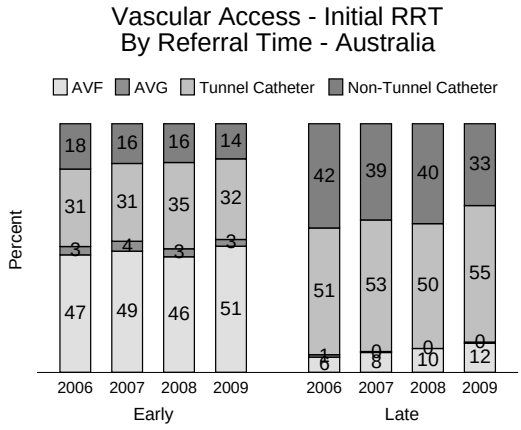


Figure 5.76

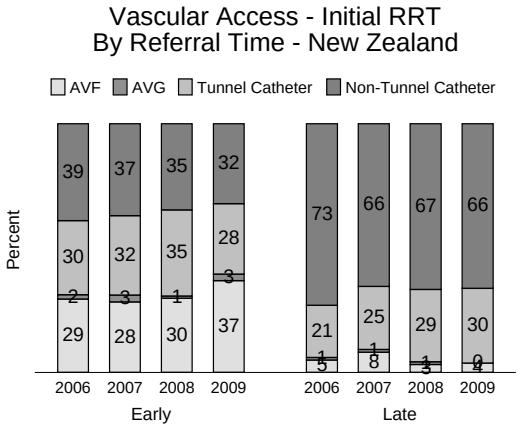


Figure 5.77

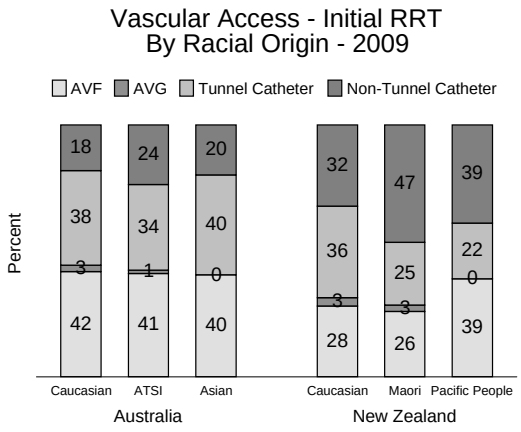
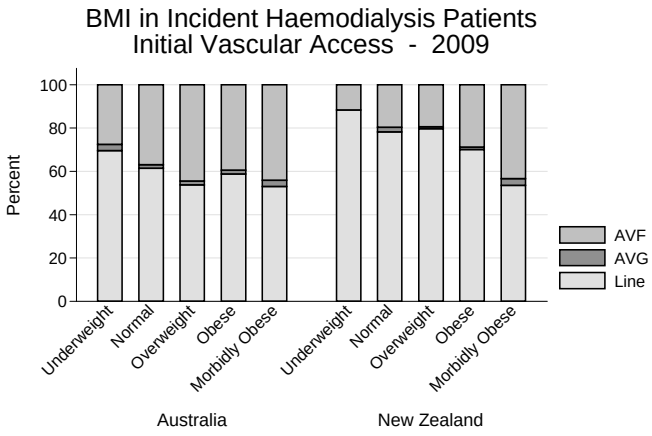


Figure 5.78



VASCULAR ACCESS AT FIRST TREATMENT

Figure 5.79

Vascular Access at First Treatment
Haemodialysis as Initial Modality 1-Jan-2006 to 31-Dec-2009

	2006		2007		2008		2009	
	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC
Australia								
Queensland	136 (39%)	215 (61%)	151 (42%)	209 (58%)	137 (35%)	250 (65%)	151 (41%)	216 (59%)
NSW/ACT	181 (32%)	393 (68%)	198 (35%)	365 (65%)	185 (33%)	373 (67%)	160 (34%)	304 (66%)
Victoria	205 (48%)	220 (52%)	191 (47%)	217 (53%)	185 (47%)	209 (53%)	208 (49%)	217 (51%)
Tasmania	13 (32%)	28 (68%)	14 (41%)	20 (59%)	12 (35%)	22 (65%)	15 (43%)	20 (57%)
South Australia	69 (51%)	66 (49%)	66 (57%)	49 (43%)	71 (54%)	61 (46%)	85 (62%)	53 (38%)
Northern Territory	25 (34%)	49 (66%)	20 (31%)	44 (69%)	39 (49%)	40 (51%)	27 (46%)	32 (54%)
Western Australia	58 (33%)	117 (67%)	60 (33%)	122 (67%)	66 (34%)	130 (66%)	65 (39%)	101 (61%)
New Zealand								
	77 (23%)	251 (77%)	77 (25%)	232 (75%)	73 (23%)	248 (77%)	109 (31%)	239 (69%)

Figures 5.80 and 5.81 show the proportion of patients of each hospital starting haemodialysis with AVF/AVG, arranged from the lowest to the highest. In Australia, this ranged widely from 19-75%. The corresponding range in New Zealand was 18-75%. This wide variation probably reflects differences in practices, protocols, resources and patient case-mix among centres. However, the patient case-mix is unlikely to explain all of this variation.

Figure 5.80

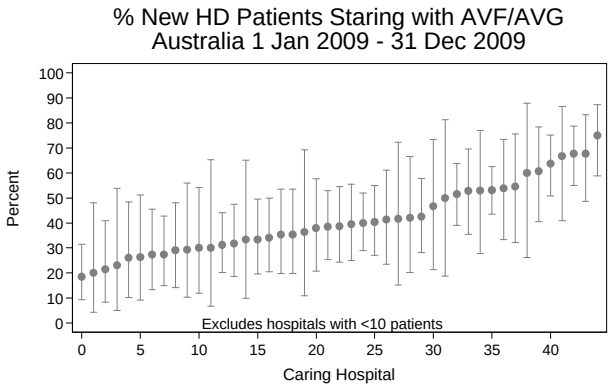
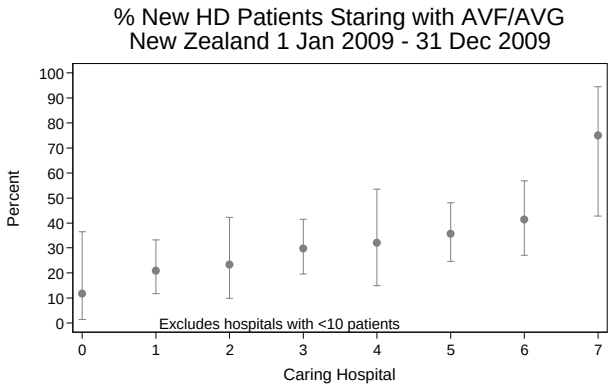


Figure 5.81



PREVALENT HAEMODIALYSIS ACCESS

Figures 5.82 - 5.88

In both Australia and New Zealand, the proportions of patients dialysing with an AV graft are declining, while those dialysing with an AV fistulae are stable. The proportions dialysing with catheters have also stabilised.

Female patients in both countries, young (age < 25 years) in Australia or old (age ≥75 years) patients in New Zealand were less likely to be dialysing with an AVF or AVG.

Figure 5.82

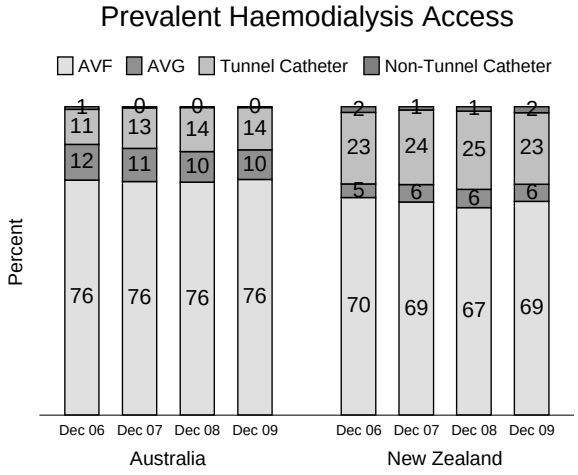
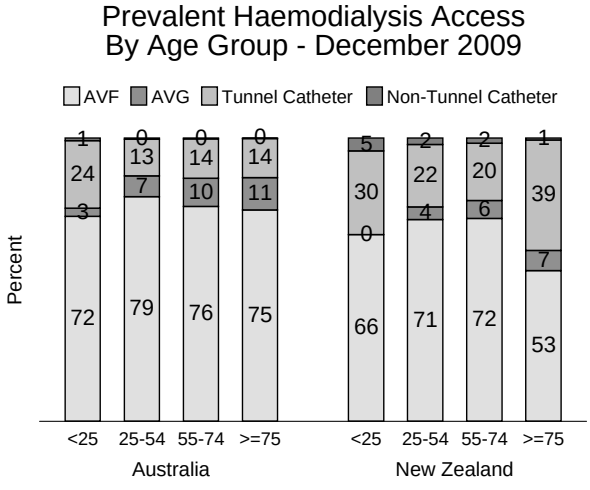


Figure 5.83



PREVALENT HAEMODIALYSIS ACCESS

Figure 5.84

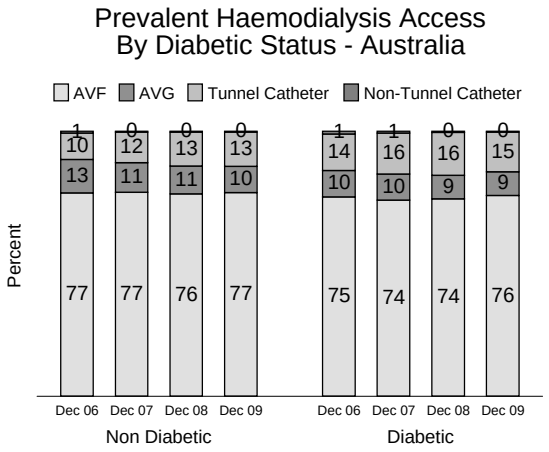


Figure 5.85

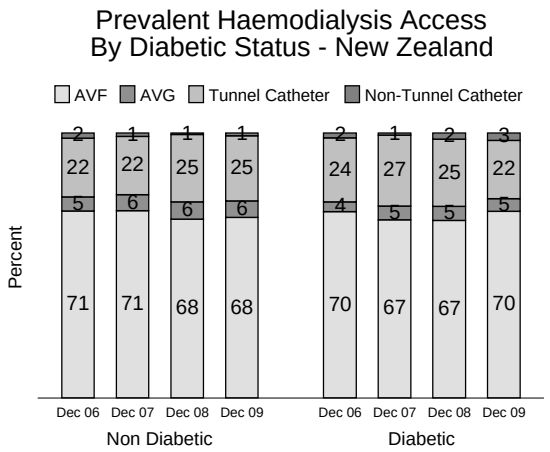


Figure 5.86

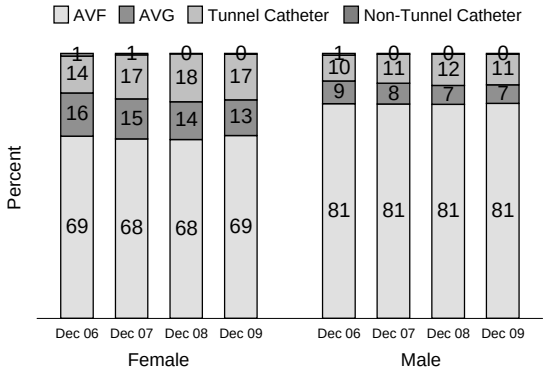


Figure 5.87

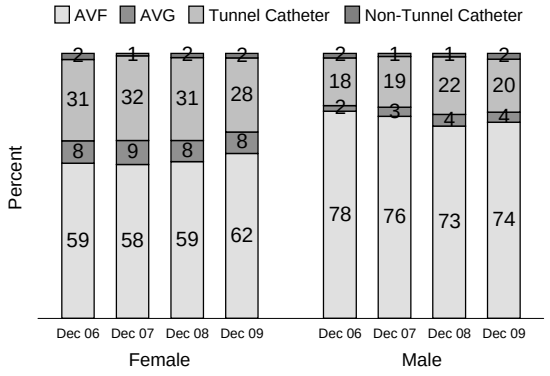
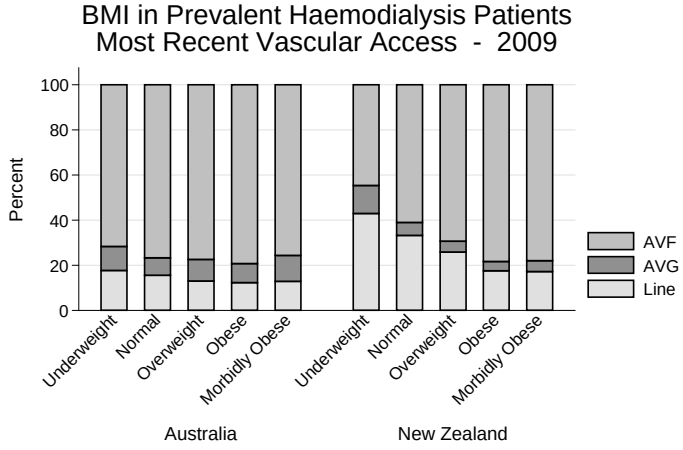


Figure 5.88



PREVALENT HAEMODIALYSIS ACCESS

Figures 5.89 - 5.90

In Australia indigenous people were more likely to dialyse with an AVF. In New Zealand, Maori and Pacific people were more likely to dialyse with an AVF.

Patients on home haemodialysis have the highest rate of AVF use in both Australia and New Zealand.

Figure 5.89

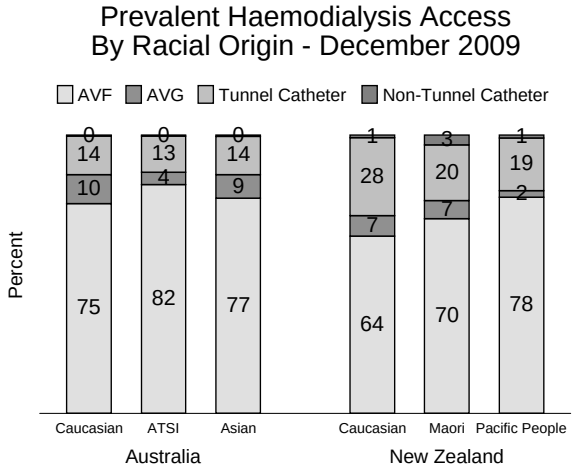
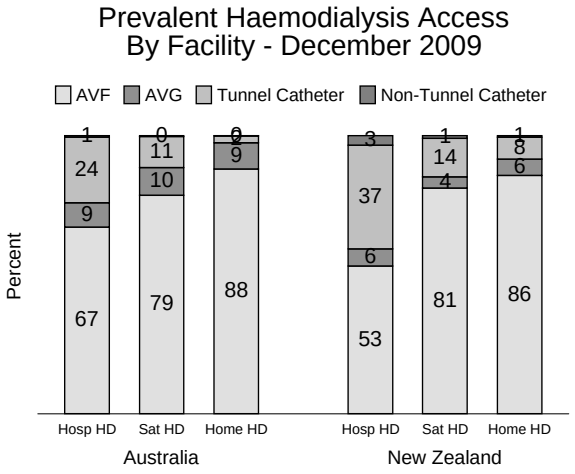


Figure 5.90



PREVALENT HAEMODIALYSIS ACCESS

Figure 5.91

Prevalent Vascular Access at 31-Dec-2009

	Dec 2006		Dec 2007		Dec 2008		Dec 2009	
	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC	AVF or AVG	CVC
Australia								
Queensland	1162 (90%)	125 (10%)	1230 (89%)	149 (11%)	1278 (87%)	193 (13%)	1362 (88%)	193 (12%)
NSW/ACT	2062 (86%)	337 (14%)	2139 (84%)	394 (16%)	2191 (84%)	421 (16%)	2219 (83%)	444 (17%)
Victoria	1738 (90%)	195 (10%)	1785 (89%)	221 (11%)	1851 (90%)	215 (10%)	1886 (89%)	227 (11%)
Tasmania	99 (79%)	26 (21%)	113 (88%)	16 (12%)	110 (82%)	24 (18%)	117 (80%)	29 (20%)
South Australia	445 (94%)	28 (6%)	436 (90%)	47 (10%)	429 (88%)	61 (12%)	477 (90%)	53 (10%)
Northern Territory	270 (88%)	36 (12%)	297 (89%)	38 (11%)	328 (91%)	33 (9%)	366 (95%)	18 (5%)
Western Australia	553 (81%)	133 (19%)	554 (77%)	164 (23%)	560 (73%)	204 (27%)	589 (76%)	184 (24%)
New Zealand								
	924 (75%)	308 (25%)	990 (75%)	334 (25%)	980 (73%)	360 (27%)	1100 (75%)	370 (25%)

Figures 5.92 - 5.93 show the proportion of haemodialysis patients at each hospital dialysing with an AVF/AVG on 31st December, 2009, arranged from the lowest to the highest.

In Australia, the proportions varied widely from 56-100%. The corresponding range in New Zealand was 44-88%.

The error bars displayed show the 95% confidence intervals.

Figure 5.92

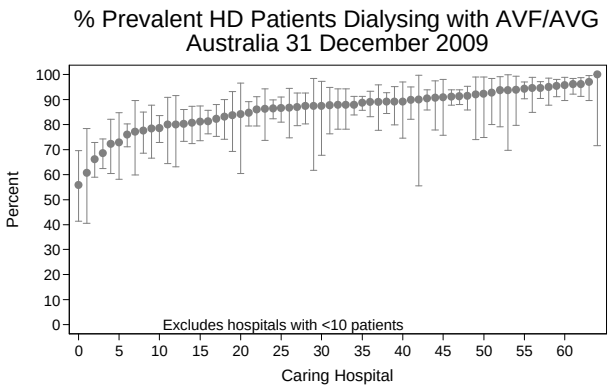
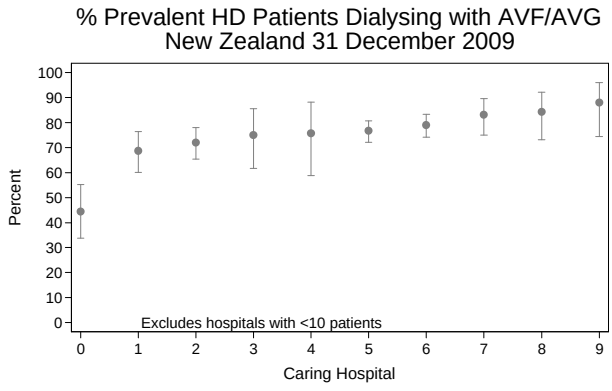


Figure 5.93



OBESITY IN INCIDENT HAEMODIALYSIS PATIENTS

Figures 5.94 - 5.99 show the proportions of incident haemodialysis patients with obesity and morbid obesity. In both Australia and New Zealand obesity rates have been increasing over the last ten years. The proportion of morbidly obese patients starting haemodialysis has doubled from 2000 to 2009 in both countries.

As might be expected, patients with diabetes are more likely to be obese or morbidly obese compared to those without diabetes (Figures 5.98 - 5.99).

Figure 5.94

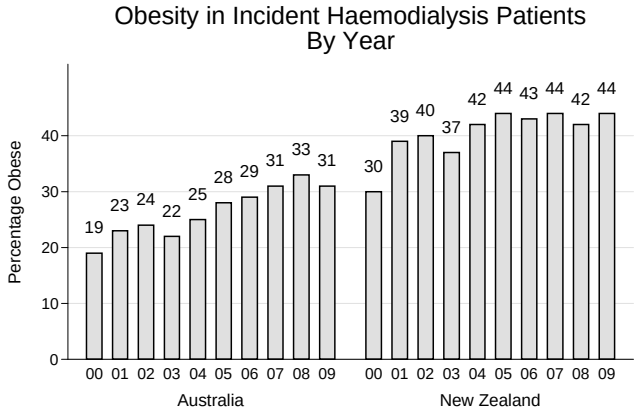


Figure 5.95

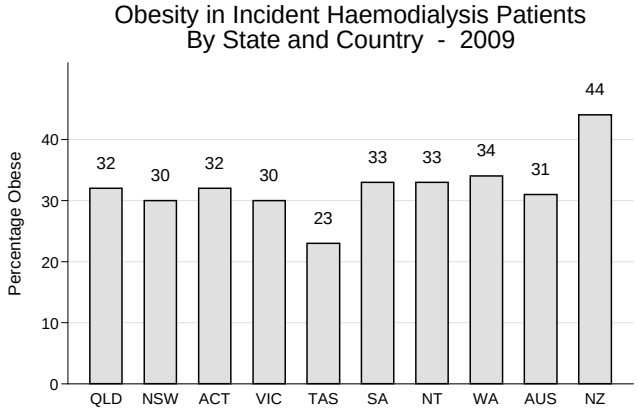


Figure 5.96

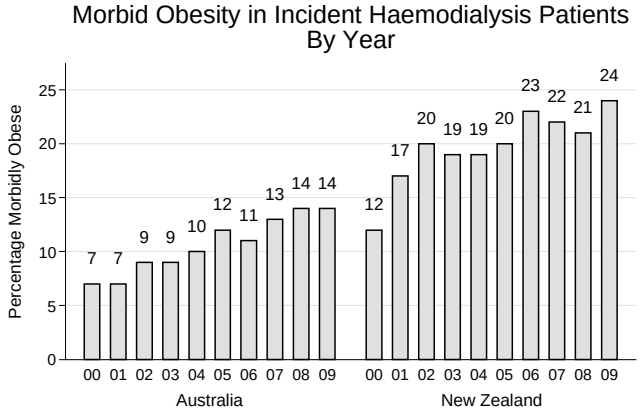


Figure 5.97

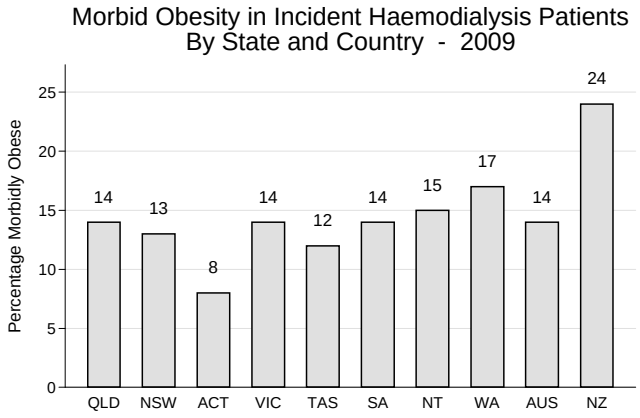


Figure 5.98

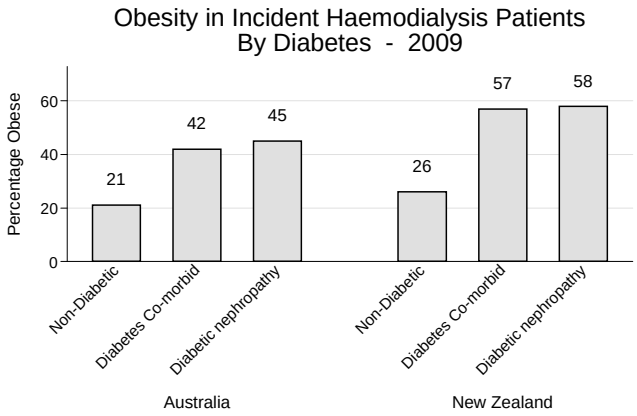
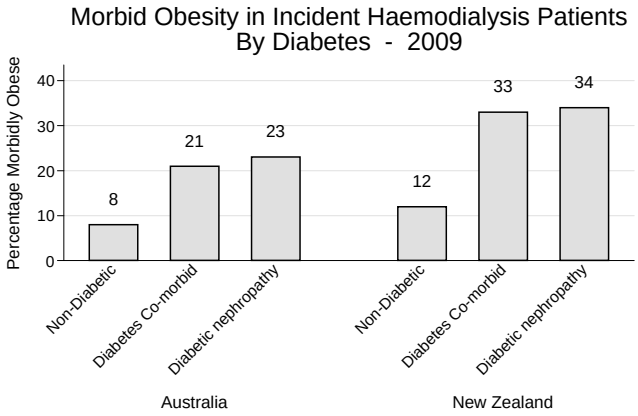


Figure 5.99



OBESITY IN PREVALENT HAEMODIALYSIS PATIENTS

Figures 5.100 - 5.105 show the proportion of prevalent haemodialysis patients with obesity and morbid obesity. In both Australia and New Zealand prevalent obesity rates have been increasing over the last ten years. The proportion of morbidly obese patients treated with haemodialysis has nearly doubled from 2000 to 2009 in both countries.

Patients with diabetes are more like to be obese or morbidly obese compared to those without diabetes (Figures 5.104 and 5.105).

Figure 5.100

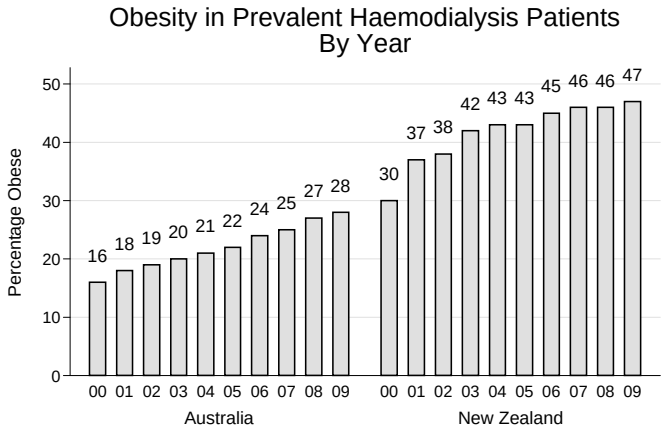


Figure 5.101

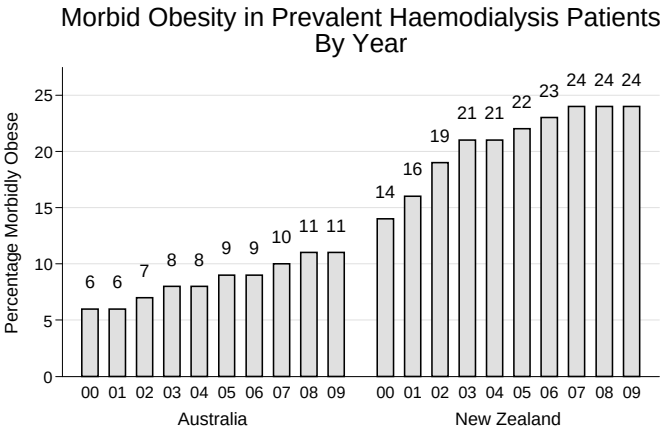


Figure 5.102

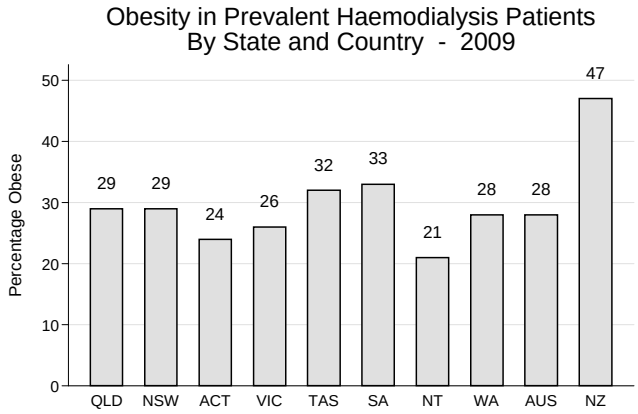


Figure 5.103

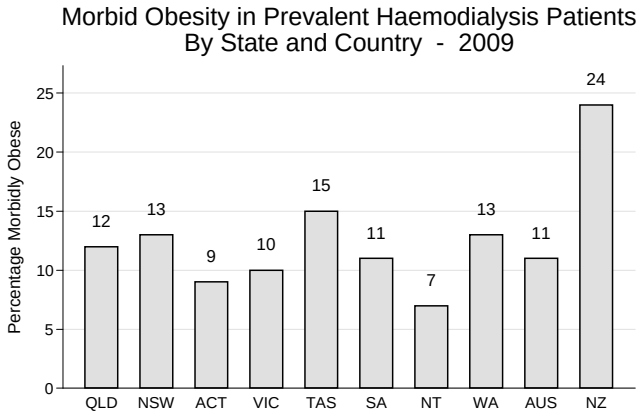


Figure 5.104

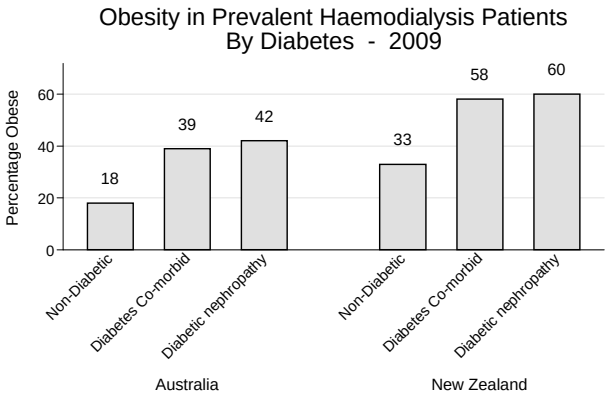
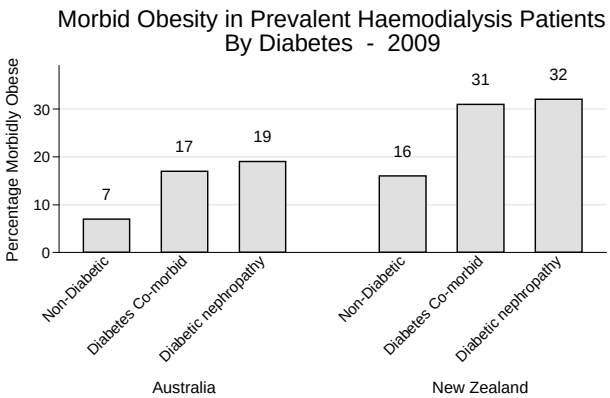


Figure 5.105



CHAPTER 6

PERITONEAL DIALYSIS

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Stephen McDonald
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STOCK AND FLOW

AUSTRALIA

Automated peritoneal dialysis was used to treat 12.5% of all dialysis patients in 2009, the same as for 2008 and continuous ambulatory peritoneal dialysis 8.5% (9.5% in 2008). Together, these accounted for 69% of all home dialysis, a figure which has remained stable for the past number of years (Figure 6.1). Of the 25,011 patients who have ever received peritoneal dialysis, 4% had experienced at least five years of continuous peritoneal dialysis (Figure 6.2).

The proportion of all home dialysis patients on peritoneal dialysis in each State ranged from 47% in the (Australian Capital Territory), to 93% (South Australia) (Figure 6.1).

The prevalence of automated peritoneal dialysis increased only 1.6% in 2009 (1293 patients), after increases of 11% in 2008 (1273 patients), 16% in 2007 (1151 patients) and 21% in 2006 (991 patients).

The annual stock and flow of patients during the period 2005-2009 is shown in Figures 6.3 and 6.4.

Figure 6.1

Proportion (%) Peritoneal Dialysis of all Home Dialysis Patients 2005 - 2009

State	2005	2006	2007	2008	2009
Queensland	74.9%	72.1%	69.9%	67.9%	66.4%
New South Wales	60.1%	62.3%	62.8%	66.6%	66.7%
ACT	73.1%	65.0%	59.6%	48.9%	47.3%
Victoria	69.6%	68.8%	66.3%	66.6%	66.4%
Tasmania	73.5%	80.9%	86.8%	83.3%	82.8%
South Australia	87.9%	92.3%	95.3%	94.6%	92.6%
Northern Territory	86.1%	65.0%	66.7%	62.7%	54.8%
Western Australia	89.8%	89.0%	89.5%	89.0%	86.4%
Australia	69.1%	69.3%	69.0%	69.9%	69.1%
New Zealand	70.5%	70.2%	69.3%	69.6%	68.0%

There were 862 new peritoneal dialysis patients in the calendar year 2009, a decrease of 13% from last year following an increase of 11% (995 patients) in 2008. There were 565 patients (66%) who started renal replacement therapy with peritoneal dialysis, (24% of all new dialysis patients in 2009) and 297 (34%) who previously had haemodialysis or a failed transplant (Figure 6.3).

New patients over the age of 65 years decreased 6%, from 405 to 379 in 2009, following an increase of 13% in 2008 (Figure 6.8).

There were decreases in most of the age groups in 2009 except the 0-14 year group which increased (50%) and the ≥ 85 years (42%). The decreases were in the groups 35-44 years (30%), 45-54 years (29%), 15-24 years (19%), 75-84 years (15%), 55-64 years (13%) and 65-74 years (3%).

The proportion of patients in each group treated with peritoneal dialysis ranged from 14% (≥ 85 years), 19% (75-84 years) to 36% (15-24 years) and 76% (0-14 years) (Figure 6.9).

There were 308 deaths in 2009 compared to 293 in 2008.

For more detail see Appendix II at our website (www.anzdata.org.au/v1/report_2010.html).

There were 154 peritoneal dialysis patients who received a transplant in 2009 compared to 176 in 2007; this was 7% of all patients treated and 12% of patients <65 years treated during the year (Figure 6.3). Thirteen patients ≥ 65 years were transplanted.

Permanent transfer to haemodialysis in 2009 occurred in 569 patients (26%) and 594 patients (27%) in 2008. (Figure 6.3).

The number of new patients to peritoneal dialysis with diabetic nephropathy as a primary renal disease decreased 20% in 2009, following a 16% increase in 2008; this group comprised 30% of all new peritoneal dialysis patients compared to 33% in 2008.

There was an 8% decrease in glomerulonephritis in 2009 (239 patients) compared to an increase of 12% (260 patients) from 2007 to 2008 (Figure 6.8).

Figure 6.2

Continuous Period of Peritoneal Dialysis 1963 - 2009

	Months													
	0-<6	6-11	12-17	18-23	24-29	30-35	36-41	42-47	48-59	60-71	72-83	84-95	96-107	≥108
Australia														
1st Treatment (n=20,682)	6176	3743	2726	2082	1607	1070	839	654	814	452	241	141	63	74
All Treatments (n=25,011)	7760	4603	3292	2482	1861	1247	984	751	934	515	266	156	69	91
New Zealand														
1st Treatment (n=5,585))	1055	864	699	640	516	418	364	248	373	177	93	65	36	37
All Treatments (n=6,619))	1333	1039	846	748	610	480	413	277	406	201	108	72	41	45

Figure 6.3

Stock and Flow of Peritoneal Dialysis Patients 2005 - 2009

State	2005	2006	2007	2008	2009
Australia					
Patients new to PD	833	1005	895	995	862
First Dialysis Treatment	479	582	587	655	565
Previous Dialysis (HD)	345	405	287	308	274
Failed Transplant	9	18	21	32	23
Transplanted	124	136	142	176	154
Deaths	275	290	296	293	308
Never Transplanted	269	282	292	279	298
Previous Transplant	6	8	4	14	10
Transfer to Haemodialysis	517	542	532	594	569
Patients Dialysing (PD) at 31 December	1860	2047	2135	2237	2177
Patients Dialysing (PD) at Home 31 December	1835	2015	2109	2200	2157
% of all Home Dialysis Patients	69%	69%	69%	70%	69%
New Zealand					
Patients new to PD	252	297	241	273	276
First Dialysis Treatment	148	159	131	152	195
Previous Dialysis (HD)	101	127	104	115	78
Failed Transplant	3	11	6	6	3
Transplanted	35	23	37	28	35
Deaths	148	152	120	124	126
Never Transplanted	143	149	113	117	124
Previous Transplant	5	3	7	7	2
Transfer to Haemodialysis	132	137	149	150	133
Patients Dialysing (PD) at 31 December	718	766	745	762	790
Patients Dialysing (PD) at Home 31 December	713	758	741	757	785
% of all Home Dialysis Patients	71%	70%	69%	70%	68%

Figure 6.4

Stock and Flow of Peritoneal Dialysis Patients
Australia 2005-2009

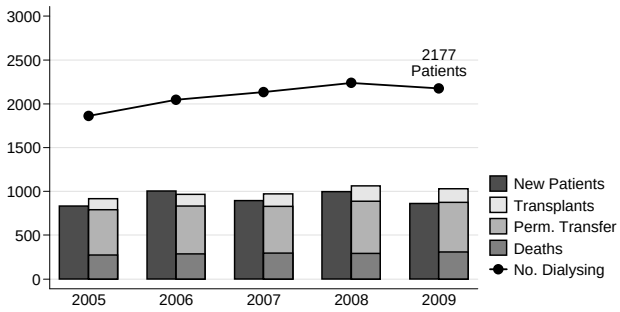


Figure 6.5

Stock and Flow of Peritoneal Dialysis Patients
New Zealand 2005-2009

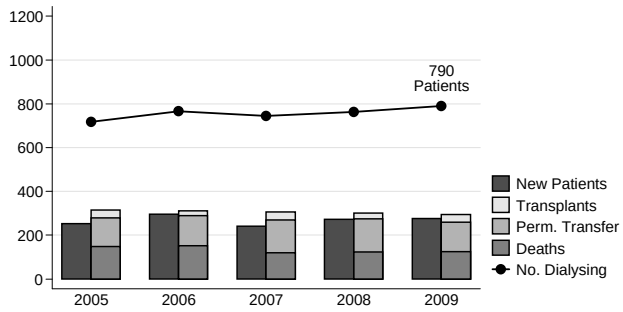


Figure 6.6

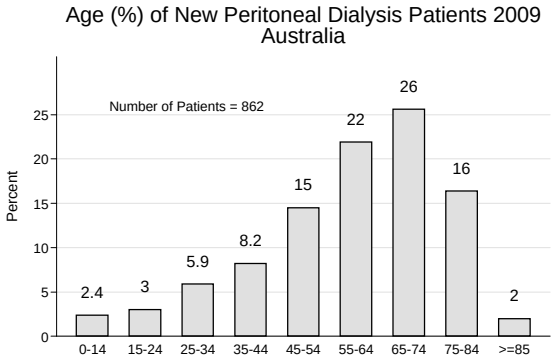


Figure 6.7

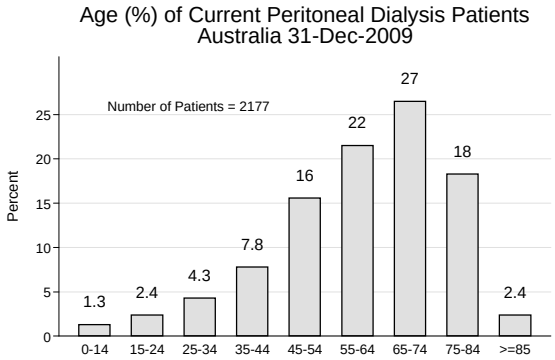


Figure 6.8 Australia

Stock and Flow of Peritoneal Dialysis by Age Groups 2005 - 2009

Age Groups	2005	2006	2007	2008	2009
New Patients *					
00-14 years	10 (1%)	16 (2%)	22 (2%)	14 (1%)	21 (2%)
15-24 years	20 (2%)	20 (2%)	18 (2%)	32 (3%)	26 (3%)
25-34 years	43 (5%)	60 (6%)	43 (5%)	51 (5%)	51 (6%)
35-44 years	89 (11%)	96 (10%)	95 (11%)	101 (10%)	71 (8%)
45-54 years	113 (14%)	170 (17%)	160 (18%)	176 (18%)	125 (15%)
55-64 years	190 (23%)	217 (22%)	198 (22%)	216 (22%)	189 (22%)
65-74 years	214 (26%)	249 (25%)	201 (22%)	227 (23%)	221 (26%)
75-84 years	141 (17%)	168 (17%)	150 (17%)	166 (17%)	141 (16%)
≥ 85 years	13 (2%)	9 (1%)	8 (1%)	12 (1%)	17 (2%)
Total	**833 (100%)**	**1005 (100%)**	**895 (100%)**	**995 (100%)**	**862 (100%)**
Patients Dialysing					
00-14 years	18 (1%)	22 (1%)	34 (2%)	28 (1%)	28 (1%)
15-24 years	29 (2%)	27 (1%)	25 (1%)	47 (2%)	52 (2%)
25-34 years	67 (4%)	86 (4%)	76 (4%)	83 (4%)	93 (4%)
35-44 years	182 (10%)	191 (9%)	201 (9%)	185 (8%)	169 (8%)
45-54 years	263 (14%)	310 (15%)	338 (16%)	371 (17%)	339 (16%)
55-64 years	422 (23%)	464 (23%)	479 (22%)	504 (23%)	469 (22%)
65-74 years	498 (27%)	529 (26%)	547 (26%)	551 (25%)	576 (26%)
75-84 years	355 (19%)	385 (19%)	403 (19%)	421 (19%)	399 (18%)
≥ 85 years	26 (1%)	33 (2%)	32 (1%)	47 (2%)	52 (2%)
Total	**1860 (100%)**	**2047 (100%)**	**2135 (100%)**	**2237 (100%)**	**2177 (100%)**
Primary Renal Disease *					
Glomerulonephritis	205 (25%)	266 (26%)	232 (26%)	260 (26%)	239 (28%)
Analgesic Nephropathy	31 (4%)	26 (3%)	17 (2%)	28 (3%)	12 (1%)
Hypertension	116 (14%)	137 (14%)	131 (15%)	118 (12%)	143 (17%)
Polycystic Disease	52 (6%)	53 (5%)	50 (6%)	66 (7%)	52 (6%)
Reflux Nephropathy	29 (3%)	43 (4%)	29 (3%)	40 (4%)	38 (4%)
Diabetic Nephropathy	274 (33%)	324 (32%)	283 (32%)	327 (33%)	262 (30%)
Miscellaneous	70 (8%)	106 (11%)	95 (11%)	79 (8%)	78 (9%)
Uncertain	56 (7%)	50 (5%)	58 (6%)	77 (8%)	38 (4%)
Total	**833 (100%)**	**1005 (100%)**	**895 (100%)**	**995 (100%)**	**862 (100%)**

* New patients receiving first peritoneal dialysis treatment

Figure 6.9

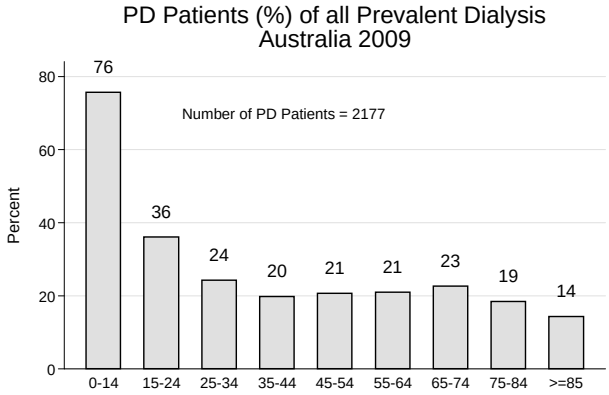


Figure 6.10

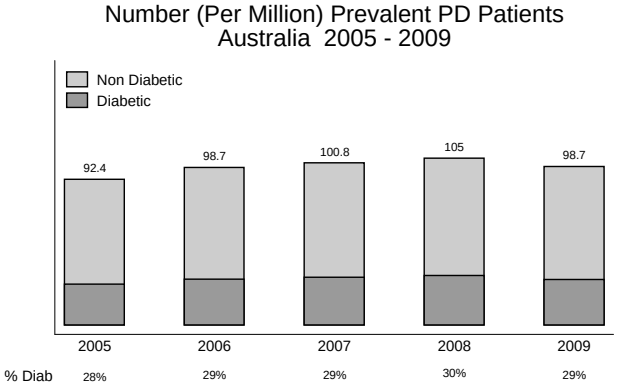


Figure 6.11

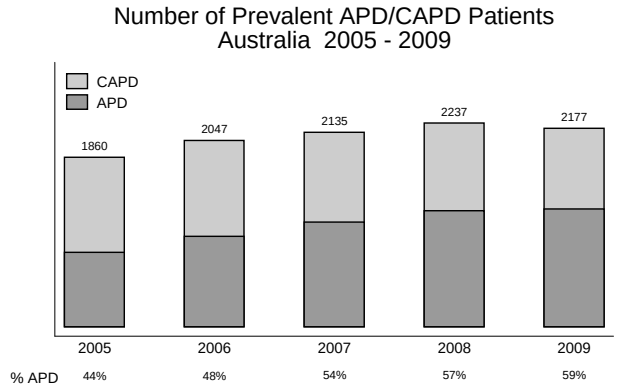


Figure 6.12

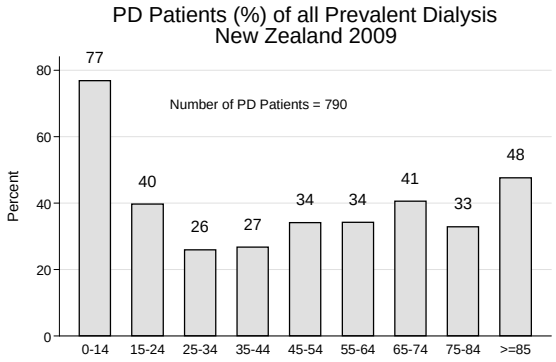


Figure 6.13

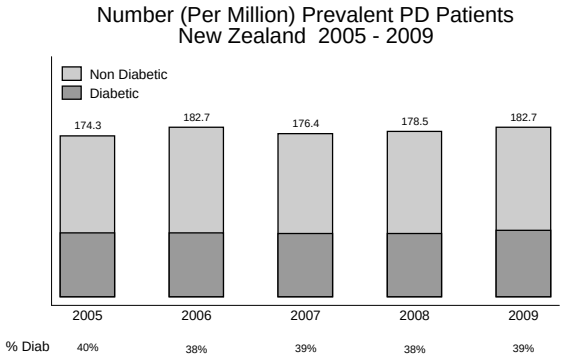
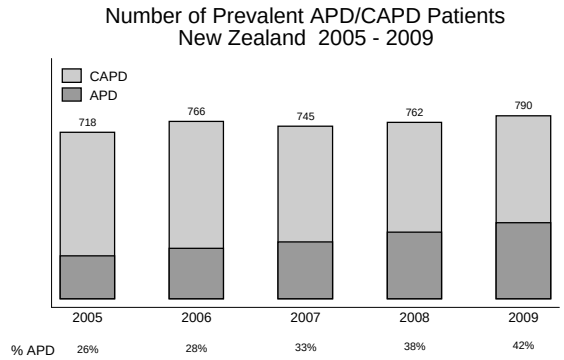


Figure 6.14



NEW ZEALAND

The annual stock and flow of patients during the period 2005 to 2009 is shown in Figures 6.3 and 6.5. Of the 6,619 patients treated since 1965, 790 (12%) were alive at 31st December, 2009 and 467 (7%) had more than five years continuous treatment (Figure 6.2).

Peritoneal dialysis accounted for 35% of all dialysis patients and 68% of all patients dialysing at home. A substantially lower proportion of patients used automated PD than in Australia. Forty two percent of all peritoneal dialysis in 2009 was automated compared with 38% in 2008 and 33% in 2007.

The age distribution of prevalent peritoneal dialysis patients is shown in Figures 6.16 and 6.17.

There were 276 new peritoneal dialysis patients in calendar year 2009, a decrease of 1% from 2008 (273 patients), after an increase of 13% from 2007 (241 patients). For 71%, peritoneal dialysis was the initial dialysis treatment compared to 56% in 2008 (Figures 6.15 and 6.17).

There were 126 deaths amongst prevalent peritoneal dialysis patients in 2009 compared to 124 in 2008. (Figure 3.11).

For more detail see Appendix III at our website (www.anzdata.org.au/v1/report_2010.html).

There were 35 patients transplanted in 2009 (28 in 2008), 4% of patients dialysed; 6% of patients <65 years treated during the year (Figure 6.3). Four patients ≥ 65 years were transplanted.

The most common primary renal disease of new patients to peritoneal dialysis was diabetic nephropathy (45%), an increase of 8% from 2008, followed by glomerulonephritis (21%) and hypertension (13%).

The proportion of patients in each group treated with peritoneal dialysis ranged from 26% (25-34 years), 27% (35-64 years) to 48% (≥ 85 years) and 77% (0-14 years) (Figure 6.12).

Figure 6.15

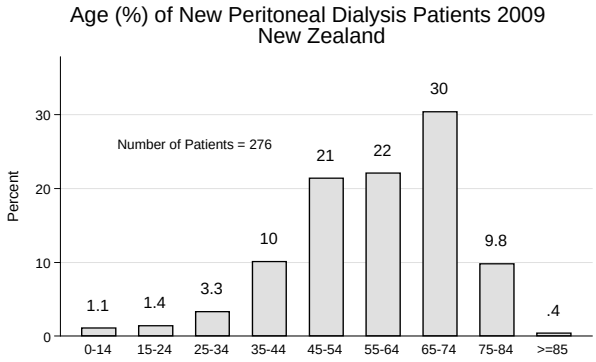


Figure 6.16

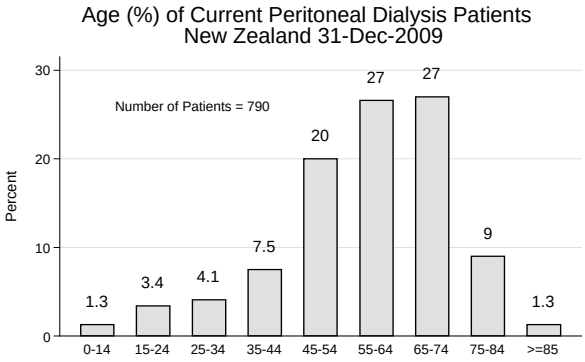


Figure 6.17 New Zealand

Stock and Flow of Peritoneal Dialysis by Age Groups 2005 - 2009

Age Groups	2005	2006	2007	2008	2009
New Patients *					
00-14 years	5 (2%)	4 (1%)	5 (2%)	10 (4%)	3 (1%)
15-24 years	3 (1%)	16 (5%)	5 (2%)	13 (5%)	4 (1%)
25-34 years	8 (3%)	11 (4%)	18 (7%)	11 (4%)	9 (3%)
35-44 years	17 (7%)	30 (10%)	21 (9%)	21 (8%)	28 (10%)
45-54 years	44 (17%)	59 (20%)	43 (18%)	55 (20%)	59 (21%)
55-64 years	75 (30%)	70 (24%)	74 (31%)	77 (28%)	61 (22%)
65-74 years	74 (29%)	66 (22%)	54 (22%)	69 (25%)	84 (30%)
75-84 years	24 (10%)	39 (13%)	18 (7%)	17 (6%)	27 (10%)
≥ 85 years	2 (1%)	2 (1%)	3 (1%)	-	1 (<1%)
Total	**252 (100%)**	**297 (100%)**	**241 (100%)**	**273 (100%)**	**276 (100%)**
Patients Dialysing					
00-14 years	9 (1%)	8 (1%)	8 (1%)	13 (2%)	10 (1%)
15-24 years	14 (2%)	21 (3%)	23 (3%)	28 (4%)	27 (3%)
25-34 years	31 (4%)	35 (5%)	36 (5%)	30 (4%)	32 (4%)
35-44 years	58 (8%)	69 (9%)	64 (9%)	62 (8%)	59 (7%)
45-54 years	115 (16%)	130 (17%)	120 (16%)	142 (19%)	158 (20%)
55-64 years	182 (25%)	185 (24%)	195 (26%)	209 (27%)	210 (27%)
65-74 years	201 (28%)	198 (26%)	186 (25%)	185 (24%)	213 (27%)
75-84 years	99 (14%)	112 (15%)	99 (13%)	80 (10%)	71 (9%)
≥ 85 years	9 (1%)	8 (1%)	14 (2%)	13 (2%)	10 (1%)
Total	**718 (100%)**	**766 (100%)**	**745 (100%)**	**762 (100%)**	**790 (100%)**
Primary Renal Disease *					
Glomerulonephritis	57 (23%)	67 (23%)	55 (23%)	63 (23%)	57 (21%)
Analgesic Nephropathy	1 (<1%)	1 (<1%)	-	2 (1%)	-
Hypertension	30 (12%)	43 (14%)	26 (11%)	36 (13%)	31 (11%)
Polycystic Disease	13 (5%)	25 (8%)	11 (5%)	12 (4%)	18 (7%)
Reflux Nephropathy	7 (3%)	10 (3%)	9 (4%)	4 (1%)	5 (2%)
Diabetic Nephropathy	112 (44%)	115 (39%)	106 (44%)	115 (42%)	124 (45%)
Miscellaneous	22 (9%)	23 (8%)	27 (11%)	27 (10%)	31 (11%)
Uncertain	10 (4%)	13 (4%)	7 (3%)	14 (5%)	10 (4%)
Total	**252 (100%)**	**297 (100%)**	**241 (100%)**	**273 (100%)**	**276 (100%)**

* New patients receiving first peritoneal dialysis treatment

PERITONEAL DIALYSIS FLUIDS

At the end of 2009, 28% of CAPD and 43% of APD patients were receiving Icodextrin in Australia. These proportions were lower for CAPD, 18% and higher for APD, 61% in New Zealand. There was also considerable variation between States in Icodextrin usage rates with the highest rates seen in the Northern Territory for CAPD and Tasmania for APD. Low GDP fluids (whether lactate or bicarbonate based fluids) were used infrequently in 2009, 0-5%, with a slightly higher percentage of lactate based fluids compared with bicarbonate based.

Figure 6.18

Icodextrin Usage by Modality Type - December 2009

Modality Type	Australia			New Zealand		
	No	Yes	Total	No	Yes	Total
CAPD	638	245	883	379	86	465
	(72.25%)	(27.75%)		(81.51%)	(18.49%)	
APD	739	553	1292	127	199	326
	(57.20%)	(42.80%)		(38.96%)	(61.04%)	
Total	**1377**	**798**	**2175**	**506**	**285**	**791**
	(63.31%)	**(36.69%)**		**(63.97%)**	**(36.03%)**	

Figure 6.19

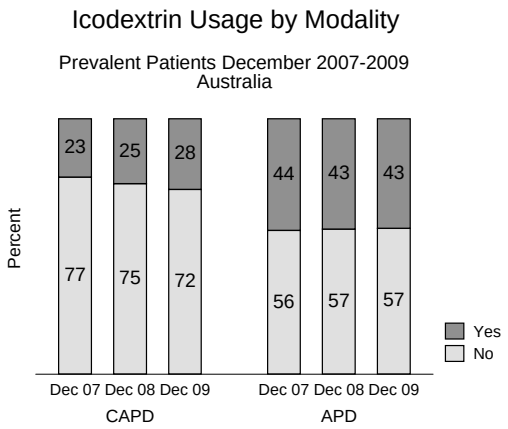


Figure 6.20

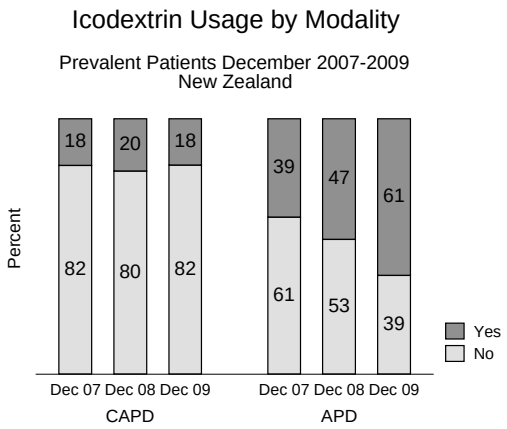
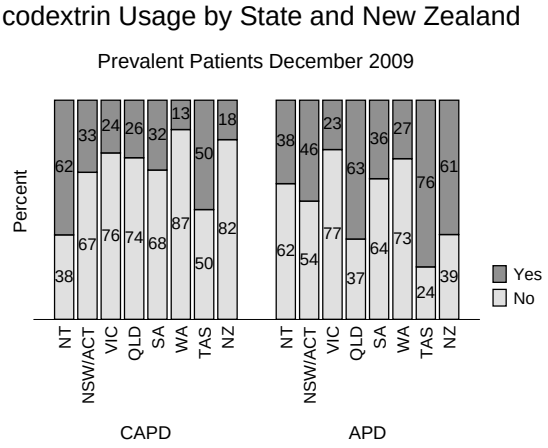


Figure 6.21



PERITONEAL DIALYSIS FLUIDS

Figure 6.22

Low GDP - Lactate Usage by Modality Type - December 2009

Modality Type	Australia			New Zealand		
	No	Yes	Total	No	Yes	Total
CAPD	839	44	883	465	-	465
	(95.02%)	(4.98%)		(100.00%)	-	
APD	1245	47	1292	313	12	325
	(96.36%)	(3.64%)		(96.31%)	(3.69%)	
Total	**2084**	**91**	**2175**	**778**	**12**	**790**
	(95.82%)	**(4.18%)**		**(98.48%)**	**(1.52%)**	

Figure 6.23

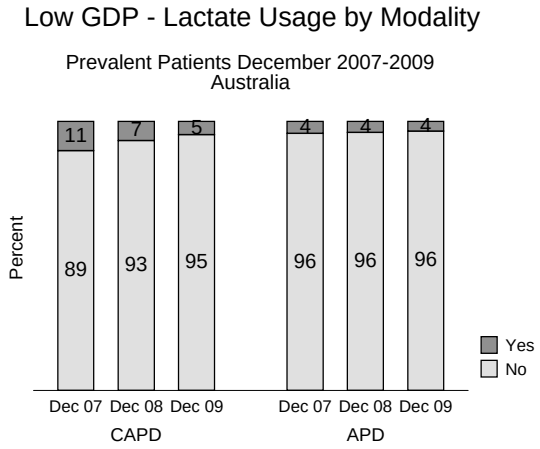
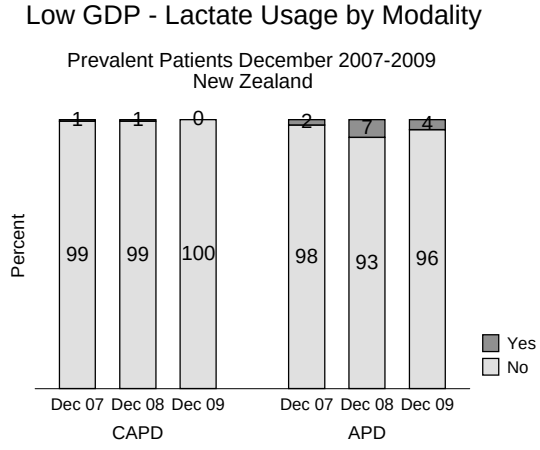


Figure 6.24



PERITONEAL DIALYSIS FLUIDS

Figure 6.25

Low GDP - Bicarb Usage by Modality Type - December 2009

Modality Type	Australia			New Zealand		
	No	Yes	Total	No	Yes	Total
CAPD	868 (98.30%)	15 (1.70%)	883	459 (98.71%)	6 (1.29%)	465
APD	1271 (98.37%)	21 (1.63%)	1292	317 (97.54%)	8 (2.46%)	325
Total	**2139 (98.34%)**	**36 (1.66%)**	**2175**	**776 (98.23%)**	**14 (1.77%)**	**790**

Figure 6.26

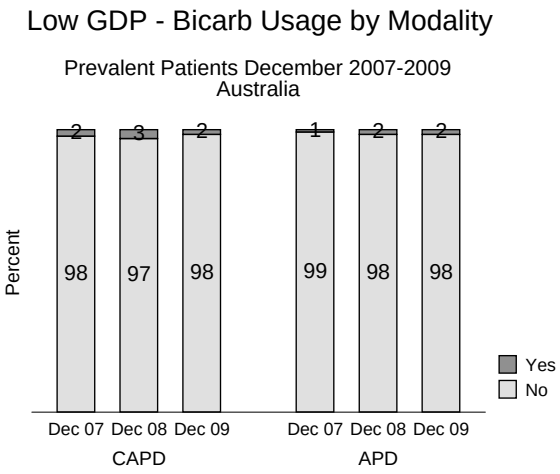
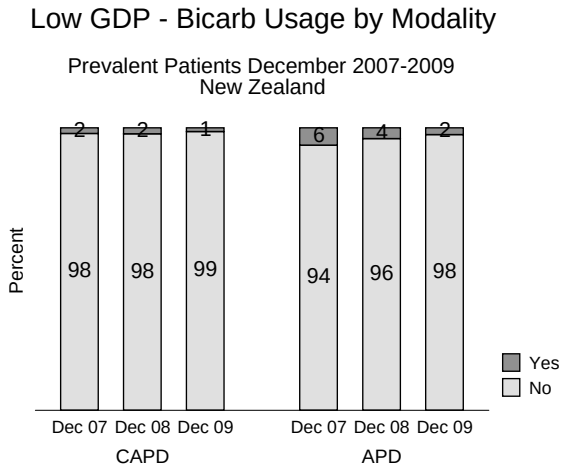


Figure 6.27



OUTCOMES AMONG PERITONEAL DIALYSIS PATIENTS

Figure 6.28

Peritoneal Dialysis at 90 Days Patient Survival
Censored for Transplant
% [95% Confidence Interval]

Year of Starting	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
1998-2000	1758	92 [91, 94]	86 [85, 88]	59 [57, 61]	40 [37, 42]
2001-2003	1939	94 [92, 95]	87 [85, 89]	61 [58, 63]	40 [38, 43]
2004-2006	1955	94 [93, 95]	89 [88, 91]	65 [63, 67]	46 [42, 49]
2007-2009	2076	96 [95, 97]	91 [90, 92]	67 [62, 72]	-
New Zealand					
1998-2000	642	96 [94, 97]	89 [86, 91]	58 [54, 62]	36 [32, 40]
2001-2003	663	92 [90, 94]	84 [81, 87]	56 [52, 60]	36 [32, 39]
2004-2006	635	95 [92, 96]	89 [86, 91]	62 [58, 66]	41 [36, 46]
2007-2009	611	95 [93, 97]	89 [86, 92]	72 [64, 79]	-

Methods

Survivals are calculated using the Kaplan-Meier technique. Patients are followed from the 90th day after first treatment for those on peritoneal dialysis at that time point and not transplanted during those first 90 days.

Patients are censored at first transplant and at most recent follow up regardless of dialysis modality changes.

Patient Survival

On univariate analyses, there has been some slight improvement in PD patient survival in Australia at six months and one, three and five years from 1998.

In New Zealand PD patient survival has been unchanged up to 2005, but has improved for the 2007-2009 cohort (Figures 6.28 - 6.30).

Diabetic PD patients had lower patient survival at all time points in both Australia and New Zealand (Figures 6.31 - 6.33).

As expected PD patient survival is closely related to age (Figures 6.34 -6.36).

Figure 6.29

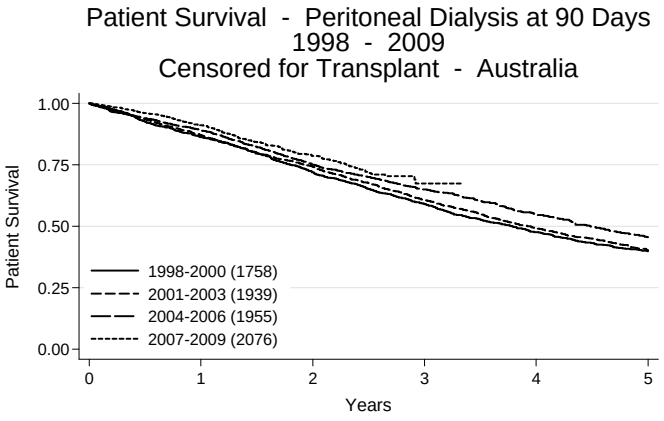


Figure 6.30

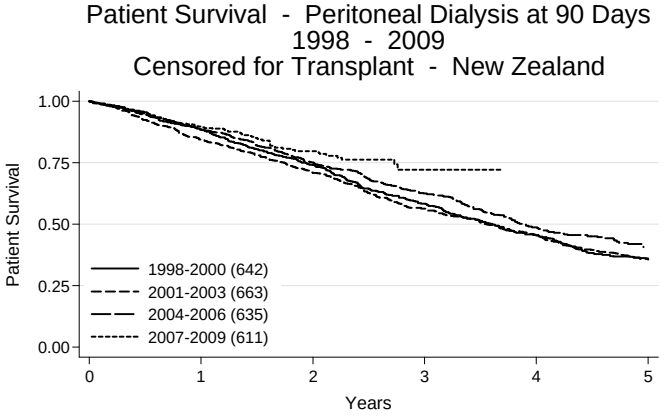


Figure 6.31

Peritoneal Dialysis at 90 Days
Patient Survival - Diabetic / Non Diabetic
Censored for Transplant Commenced 1998 - 2009
% [95% Confidence Interval]

	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
Non Diabetic	5445	95 [94, 95]	90 [89, 91]	66 [65, 68]	47 [45, 49]
Diabetic	2283	92 [91, 93]	85 [84, 87]	54 [52, 57]	33 [30, 35]
New Zealand					
Non Diabetic	1449	95 [93, 96]	89 [87, 90]	65 [62, 68]	45 [42, 49]
Diabetic	1102	94 [93, 95]	86 [84, 88]	55 [51, 58]	30 [27, 33]

Figure 6.32

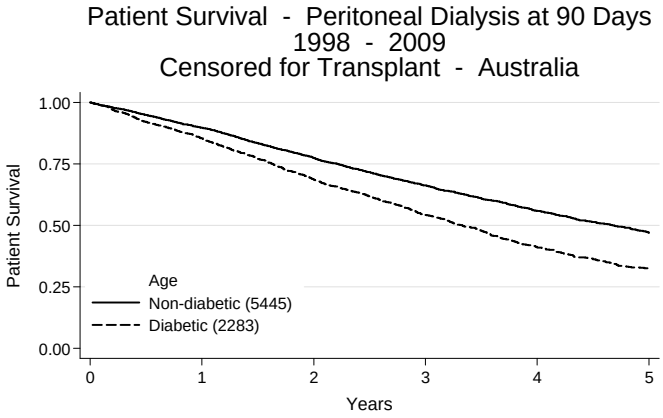


Figure 6.33

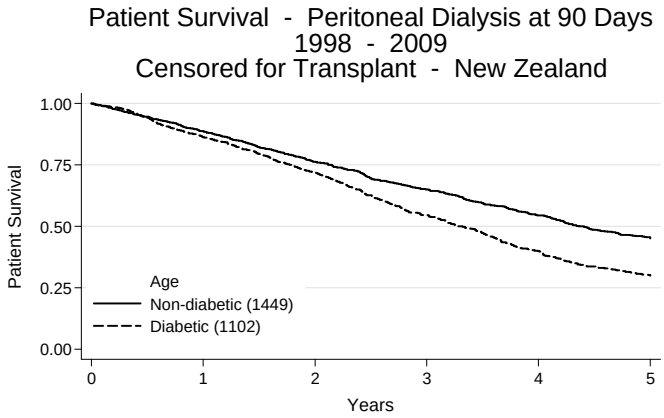


Figure 6.34

Peritoneal Dialysis at 90 Days
Patient Survival - By Age Group
Censored for Transplant 1998 - 2009
% [95% Confidence Interval]

Age Groups	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
0-39 years	1076	99 [98, 99]	98 [96, 98]	88 [85, 90]	77 [72, 81]
40-59 years	2337	96 [95, 97]	93 [92, 94]	76 [74, 78]	61 [58, 64]
60-74 years	3002	93 [92, 94]	86 [85, 88]	58 [56, 59]	36 [33, 38]
>=75 years	1313	89 [87, 91]	78 [76, 80]	40 [37, 43]	18 [15, 20]
New Zealand					
0-39 years	311	99 [97, 100]	95 [92, 97]	85 [80, 90]	74 [66, 80]
40-59 years	933	96 [94, 97]	91 [89, 93]	67 [63, 70]	45 [41, 49]
60-74 years	1033	94 [92, 95]	85 [83, 88]	55 [51, 58]	30 [27, 33]
>=75 years	274	87 [82, 90]	76 [70, 81]	38 [32, 44]	19 [14, 25]

Figure 6.35

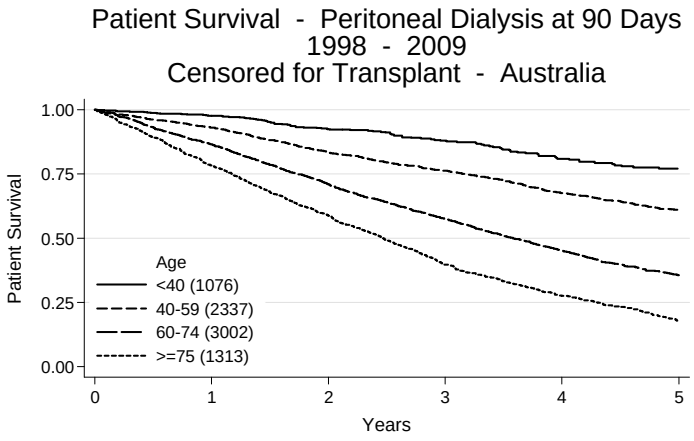
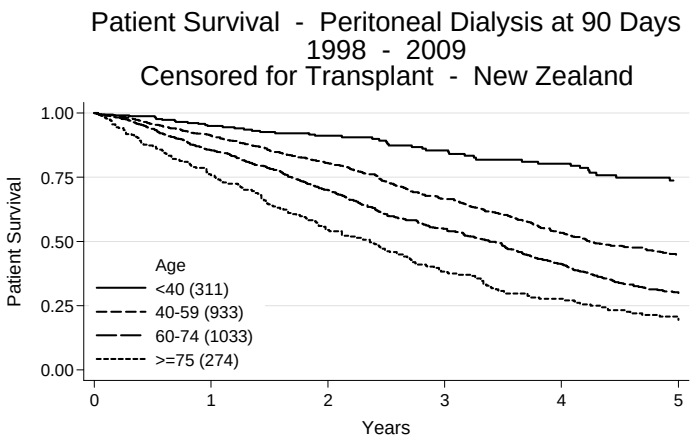


Figure 6.36



Figures 6.37 - 6.38 show survival curves for patients treated with peritoneal dialysis at day 90, adjusted to a median age of 62.6 years for Australia and 60.4 years for New Zealand; non diabetic primary renal disease; caucasoid race; female gender and no comorbid conditions (lung disease, coronary heart disease, peripheral vascular disease or cerebrovascular disease).

In Australia the patient survival continues to improve from 1998 (Figure 6.37).

In New Zealand there is an improvement in the 2007-2009 time period (Figure 6.38).

Figure 6.37

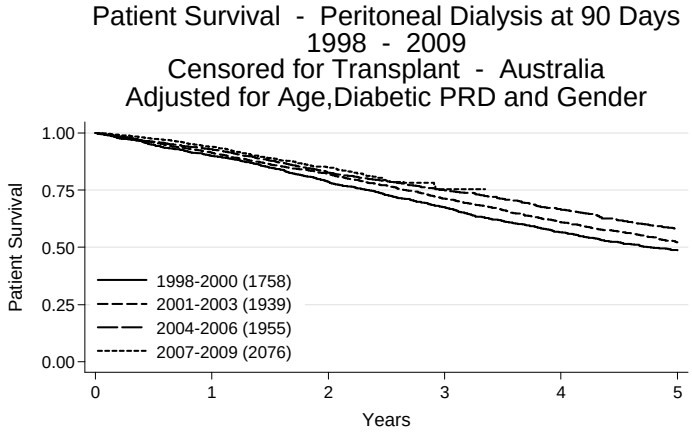
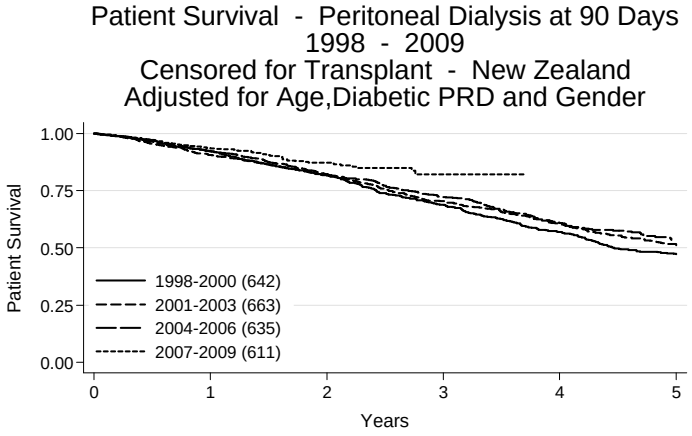


Figure 6.38



PERITONEAL DIALYSIS TECHNIQUE SURVIVAL

Figure 6.39

Peritoneal Dialysis at 90 Days
Technique Survival - Diabetic / Non Diabetic
Censored for Transplant Commenced 1998 - 2009
% [95% Confidence Interval]

	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
Non Diabetic	5445	85 [83, 85]	71 [70, 73]	35 [33, 36]	16 [14, 17]
Diabetic	2283	81 [79, 83]	68 [66, 70]	25 [23, 27]	9 [7, 11]
New Zealand					
Non Diabetic	1449	88 [86, 89]	76 [74, 78]	42 [39, 45]	19 [16, 21]
Diabetic	1102	89 [87, 90]	76 [73, 78]	34 [31, 37]	11 [9, 13]

Figure 6.40

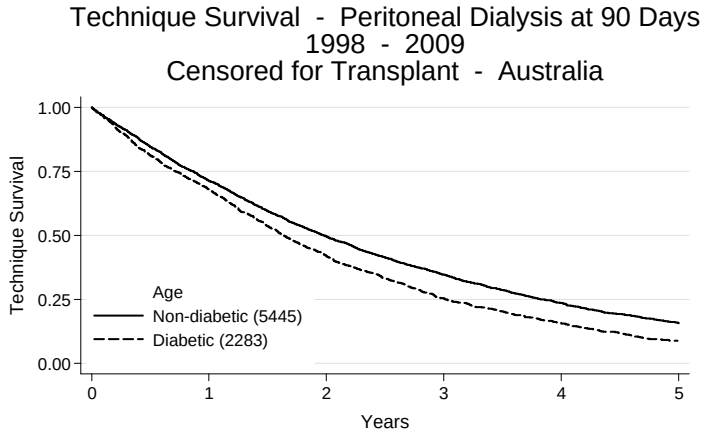


Figure 6.41

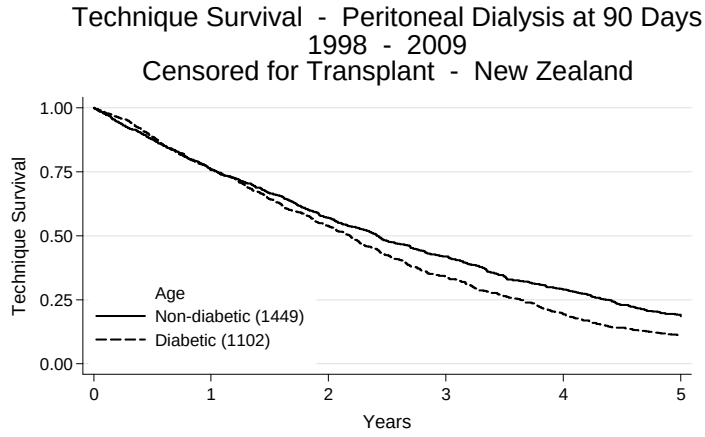


Figure 6.42

Peritoneal Dialysis at 90 Days
Technique Survival - By Age Group
Censored for Transplant 1998 - 2009
% [95% Confidence Interval]

Age Groups	No. of Patients	Survival			
		6 months	1 year	3 years	5 years
Australia					
0-39 years	1076	88 [86, 90]	76 [73, 79]	41 [37, 45]	26 [21, 31]
40-59 years	2337	85 [84, 87]	74 [72, 76]	37 [35, 40]	19 [17, 21]
60-74 years	3002	83 [81, 84]	69 [68, 71]	30 [28, 32]	12 [11, 13]
>=75 years	1313	79 [77, 82]	62 [59, 64]	22 [20, 25]	6 [4, 8]
New Zealand					
0-39 years	311	88 [86, 90]	76 [73, 79]	41 [37, 45]	26 [21, 31]
40-59 years	933	85 [84, 87]	74 [72, 76]	37 [35, 40]	19 [17, 21]
60-74 years	1033	83 [81, 84]	69 [68, 71]	30 [28, 32]	12 [11, 13]
>=75 years	274	79 [77, 82]	62 [59, 64]	22 [20, 25]	6 [4, 8]

Figure 6.43

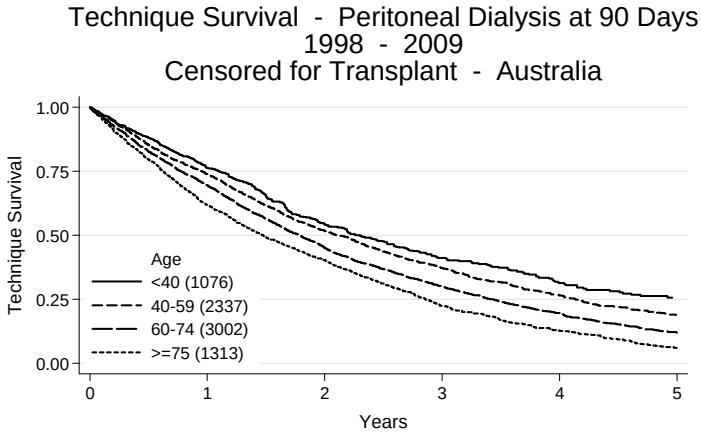
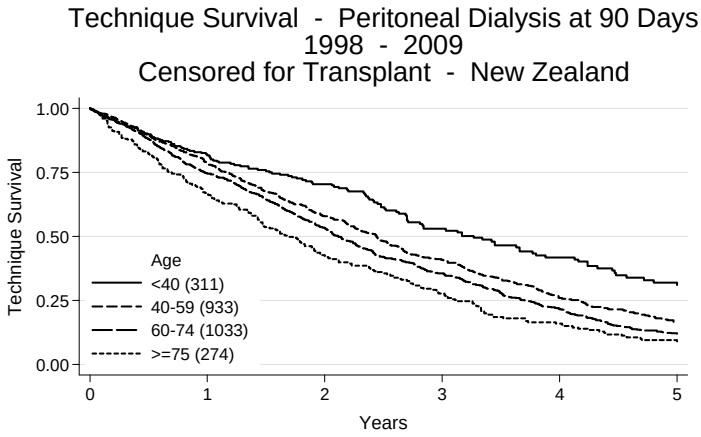


Figure 6.44



TECHNIQUE FAILURE
(CENSORED FOR DEATH OR TRANSPLANTATION)

In Australia, the most common primary cause of technique failure was a social reason (generally patient preference), rather than a technical cause. This accounted for 43% of transfers during 2008/2000 (Figure 6.45).

Infections (primarily peritonitis) were the second commonest cause, followed by inadequate dialysis and mechanical/technical complications.

In New Zealand, the most common primary cause of technique failure was also a "social reason", which accounted for 34% of transfers during 2008/2009 and infections 27% (Figure 6.45).

Figure 6.45

Causes of Technique Failure 1-Jan-2008 to 31-Dec-2009
Excluding Death, Transplantation, Recovery of Renal Function

Causes of Technique Failure	Australia	New Zealand
Recurrent/persistent peritonitis	223	72
Acute peritonitis	310	77
Tunnel/exit site infection	41	8
Total Infective Causes	**574 (27%)**	**157 (27%)**
Inadequate solute clearance	221	92
Inadequate fluid ultrafiltration	88	51
Excessive fluid ultrafiltration	3	3
Total Dialysis Failure	**312 (14%)**	**146 (25%)**
Dialysate leak	75	21
Hydrothorax	6	-
Scrotal oedema	19	1
Catheter block	51	11
Catheter fell out	6	1
Hernia	72	15
Abdominal pain	13	7
Abdominal surgery	35	14
Other surgery	18	1
Haemoperitoneum	-	1
Sclerosing Peritonitis	-	2
Miscellaneous	59	9
Multiple Adhesions	1	2
Total Technical Failure	**355 (16%)**	**85 (14%)**
Unable to manage self care	120	33
Patient preference	795	167
Transfer outside Australia/NZ	10	2
Total Social Reasons	**925 (43%)**	**202 (34%)**

PERITONITIS

Australian median time to first peritonitis was 19.2 months overall, with 29% of patients completely free of peritonitis at three years. In New Zealand the time was 15.7 months (24% of patients free of peritonitis at three years), (Figure 6.46). As noted in previous reports there is a strong association between ethnicity and peritonitis free survival (Figure 6.49).

The median peritonitis-free survival for home automated peritoneal dialysis patients was 21.0 months in Australia, and 12.8 months in New Zealand.

Patients are followed from the date of their first peritoneal dialysis until the date of their first episode of peritonitis regardless of changes in dialysis modality or transplant. Those who never had peritonitis are censored at transplant or change of dialysis modality.

Figure 6.46

First PD Treatment to First Episode of Peritonitis
Related to Age at Entry 01-Jan-2005 to 31-Dec-2009

Survival	Age Groups						All
	00-14	15-34	35-54	55-64	65-74	>=75	
Australia	**(n=83)**	**(n=364)**	**(n=1196)**	**(n=1010)**	**(n=1112)**	**(n=825)**	**(n=4590)**
3 months	83 [72, 89]	87 [83, 90]	86 [84, 88]	87 [85, 89]	87 [85, 89]	86 [84, 89]	87 [86, 88]
6 months	71 [60, 80]	77 [72, 81]	78 [76, 81]	79 [76, 81]	79 [76, 81]	78 [74, 81]	78 [77, 80]
9 months	61 [49, 72]	73 [68, 78]	71 [69, 74]	70 [67, 73]	71 [68, 74]	70 [66, 73]	71 [69, 72]
1 year	59 [46, 70]	68 [62, 73]	65 [62, 68]	64 [60, 67]	63 [60, 66]	62 [58, 66]	64 [62, 65]
2 years	39 [21, 56]	50 [42, 57]	46 [42, 49]	40 [36, 44]	44 [40, 48]	43 [39, 48]	44 [42, 46]
3 years	26 [7, 51]	28 [18, 39]	31 [26, 35]	27 [22, 32]	29 [24, 33]	28 [23, 34]	29 [26, 31]
New Zealand	**(n=27)**	**(n=98)**	**(n=377)**	**(n=357)**	**(n=347)**	**(n=133)**	**(n=1339)**
3 months	77 [56, 89]	84 [74, 90]	88 [85, 91]	84 [79, 87]	86 [82, 90]	88 [81, 92]	86 [84, 88]
6 months	56 [34, 73]	75 [64, 83]	74 [69, 78]	73 [68, 77]	76 [71, 80]	80 [71, 86]	74 [72, 77]
9 months	40 [21, 60]	61 [50, 71]	64 [58, 69]	63 [58, 69]	66 [60, 71]	68 [59, 76]	64 [61, 67]
1 year	25 [8, 47]	58 [47, 68]	58 [53, 64]	59 [53, 64]	55 [49, 61]	62 [52, 71]	57 [54, 60]
2 years	-	46 [33, 58]	37 [31, 44]	39 [32, 45]	38 [32, 45]	34 [23, 45]	38 [34, 41]
3 years	-	22 [9, 38]	27 [21, 34]	26 [19, 34]	23 [16, 31]	20 [10, 31]	24 [21, 28]

% Survival [95% Confidence Interval

Figure 6.47

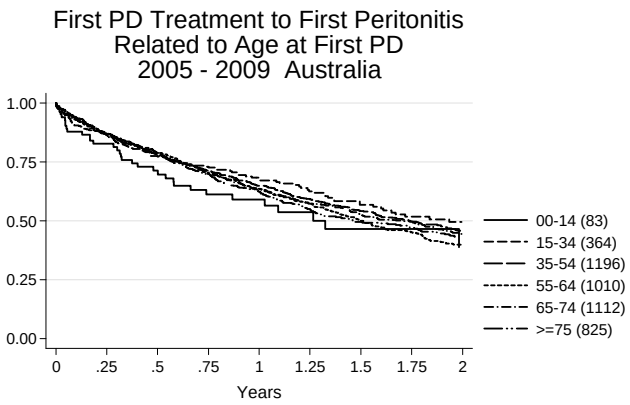


Figure 6.48

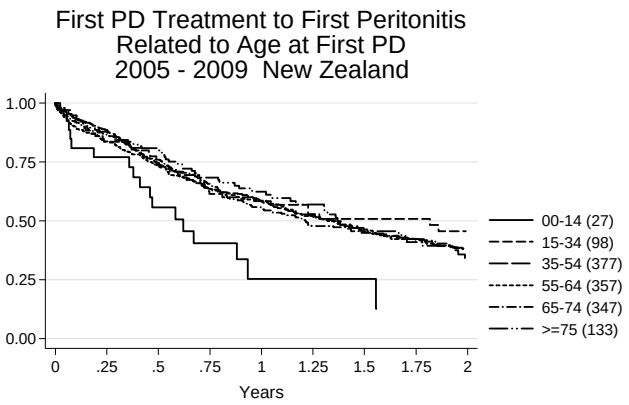
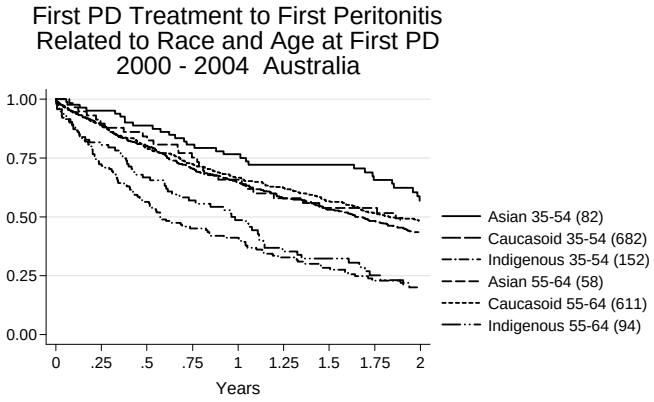


Figure 6.49



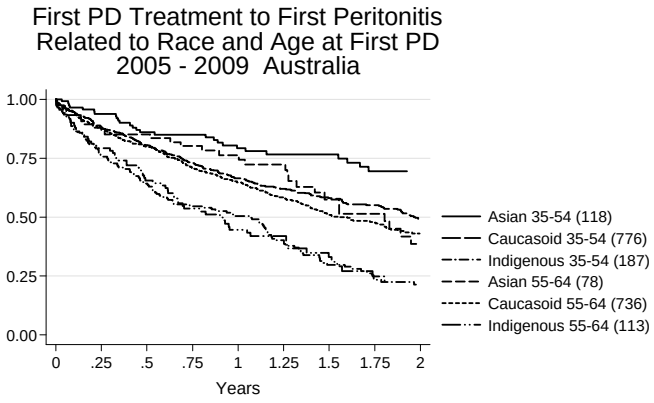
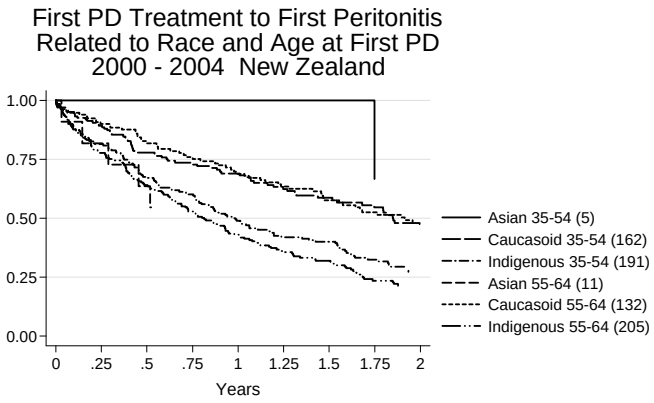


Figure 6.50



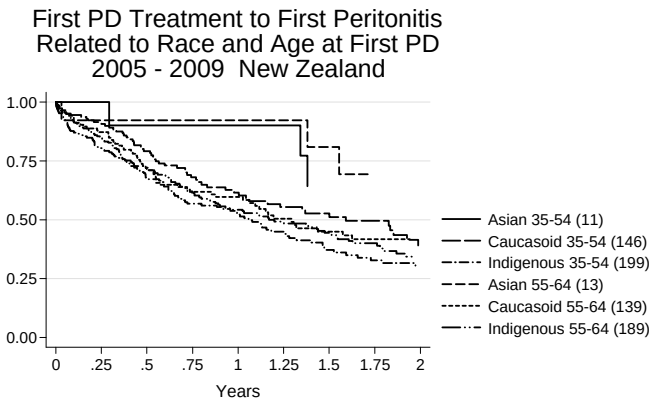


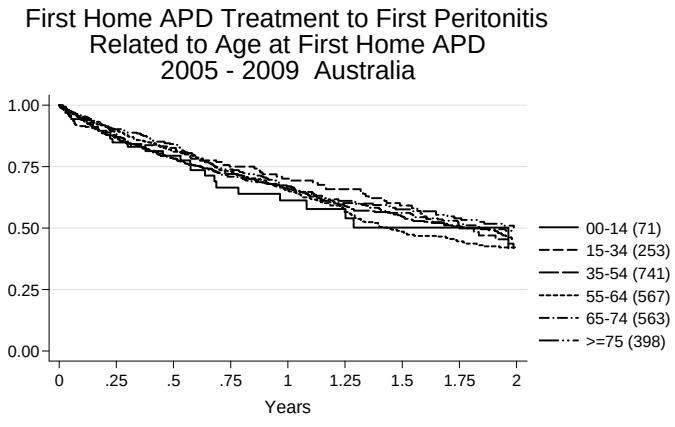
Figure 6.51

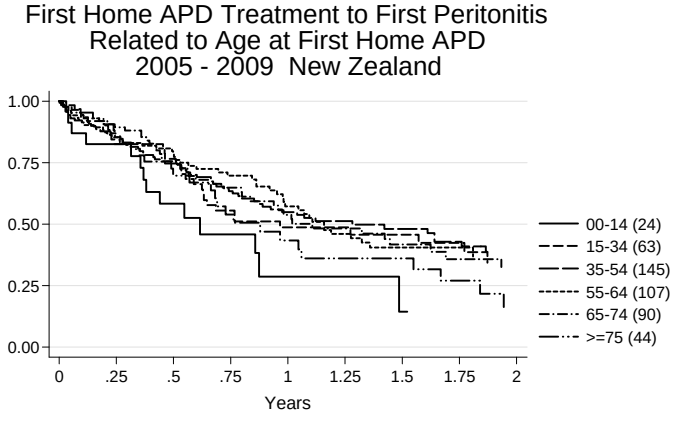
First Home APD Treatment to First Episode of Peritonitis
Related to Age at Entry 01-Jan-2005 to 31-Dec-2009

Survival	Age Groups						All
	00-14	15-34	35-54	55-64	65-74	>=75	
Australia	**(n=71)**	**(n=253)**	**(n=741)**	**(n=567)**	**(n=563)**	**(n=398)**	**(n=2593)**
3 months	85 [73, 92]	87 [82, 91]	86 [84, 89]	90 [87, 92]	88 [85, 91]	90 [87, 93]	88 [87, 89]
6 months	79 [67, 88]	83 [77, 87]	78 [75, 81]	81 [77, 84]	78 [74, 82]	84 [79, 87]	80 [78, 82]
9 months	67 [52, 78]	75 [68, 80]	72 [68, 75]	73 [69, 77]	71 [67, 75]	74 [69, 79]	72 [70, 74]
1 year	61 [46, 73]	70 [63, 76]	66 [62, 70]	65 [60, 69]	67 [62, 71]	67 [61, 72]	66 [64, 68]
2 years	42 [22, 60]	42 [32, 52]	45 [40, 50]	42 [36, 47]	48 [43, 54]	50 [43, 57]	46 [43, 48]
3 years	21 [2, 54]	34 [23, 45]	33 [27, 39]	29 [22, 36]	33 [27, 40]	32 [23, 41]	32 [29, 35]
New Zealand	**(n=24)**	**(n=63)**	**(n=145)**	**(n=107)**	**(n=90)**	**(n=44)**	**(n=473)**
3 months	83 [60, 93]	83 [70, 90]	85 [78, 90]	85 [77, 91]	89 [81, 94]	86 [71, 93]	86 [82, 89]
6 months	58 [35, 76]	77 [63, 86]	75 [66, 81]	79 [69, 85]	76 [64, 84]	70 [53, 82]	75 [70, 79]
9 months	46 [23, 66]	56 [41, 68]	63 [54, 71]	70 [59, 78]	65 [53, 75]	54 [36, 69]	62 [57, 67]
1 year	29 [9, 53]	49 [34, 62]	55 [45, 64]	57 [46, 68]	54 [41, 65]	43 [26, 59]	52 [47, 57]
2 years	-	34 [19, 50]	39 [28, 49]	37 [24, 49]	33 [20, 46]	16 [5, 34]	33 [27, 39]
3 years	-	20 [7, 37]	27 [16, 40]	22 [9, 38]	11 [1, 33]	16 [5, 34]	21 [14, 27]

% Survival [95% Confidence Interval]

Figure 6.52





AUSTRALIAN PERITONITIS REGISTRY
1-OCT-2003 TO 31-DEC-2009

This section contains details of the organism and treatment for episodes of peritonitis within Australia collected by ANZDATA.

Similar information for patients in New Zealand is collected separately by the New Zealand Peritonitis Registry (reported separately).

During 2009, the number of episodes of peritonitis remained similar to previous years (shown in Figure 6.53).

Figure 6.53

Number of Peritonitis Episodes

Year	Frequency
2003	250 (3 months data only)
2004	1,196
2005	1.072
2006	1,117
2007	1,254
2008	1,369
2009	1,340
Total	**7,598**

Rates of peritonitis have fluctuated, although there has been no clear trend over the past five years (2004-2009) (Figure 6.54).

Figure 6.54

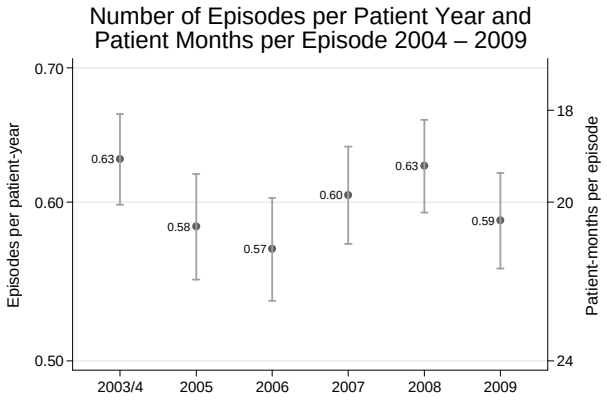
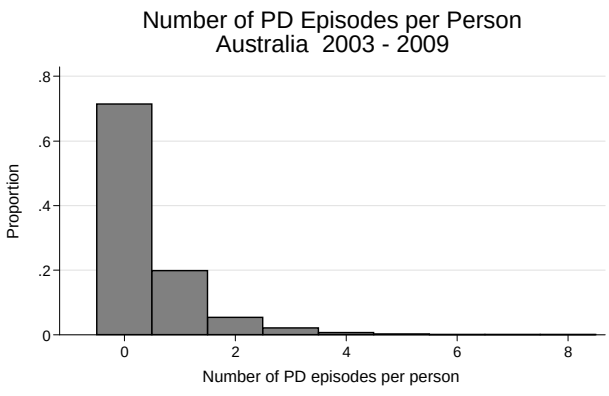
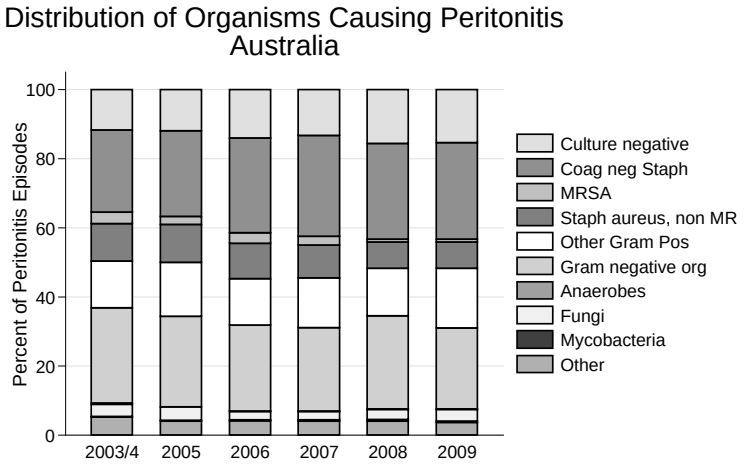


Figure 6.55



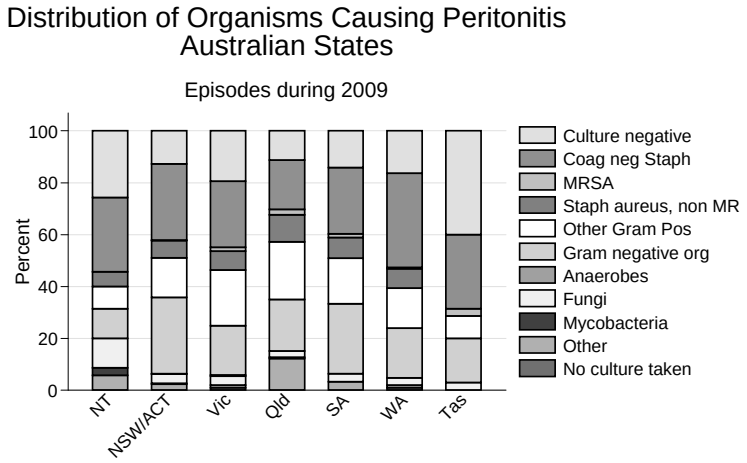
There has been a gradual trend over this time towards a lower proportion of episodes attributable to gram negative organisms and non-MRSA *S. aureus*, with a greater proportion of culture negative episodes (Figure 6.56). The Registry does not collect data on use of prior antibiotics or laboratory techniques which might influence the rate of culture negative peritonitis.

Figure 6.56



There remains quite widespread variation in the major organisms reported between the different states in Australia (Figure 6.57). We do not collect data about variation in prophylaxis, patient selection processes or PD training or other factors which might account for part or all of this variation.

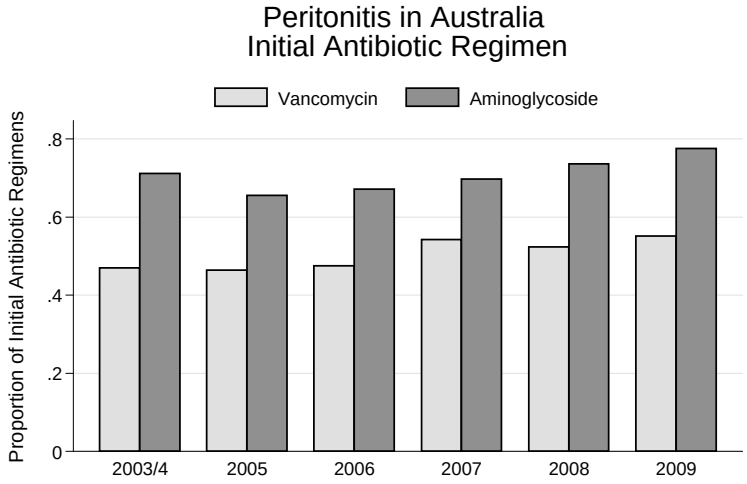
Figure 6.57



ANTIBIOTIC TREATMENT

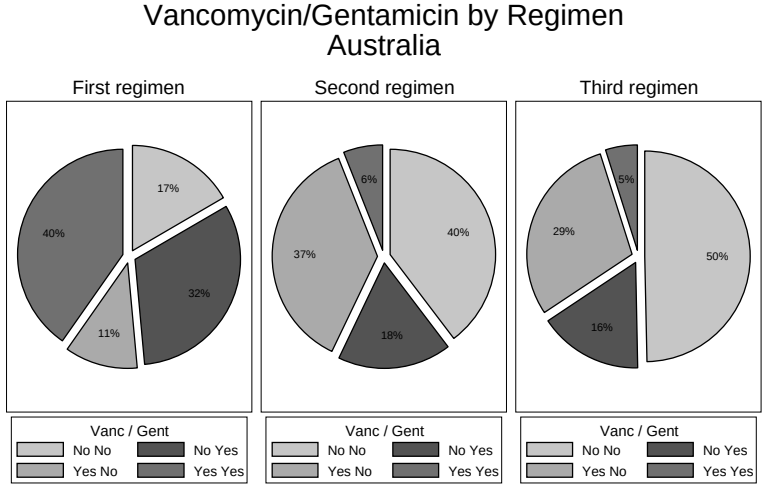
The proportion of episodes which were treated with an aminoglycoside-containing initial regimen has increased slightly over the period 2006-2009, as has the proportion treated with a regimen containing vancomycin is slowly increasing (Figure 6.58).

Figure 6.58



Among episodes of peritonitis treated during 2009, the proportion of those who received vancomycin in the initial or second antibiotic regimen is shown in Figure 6.59.

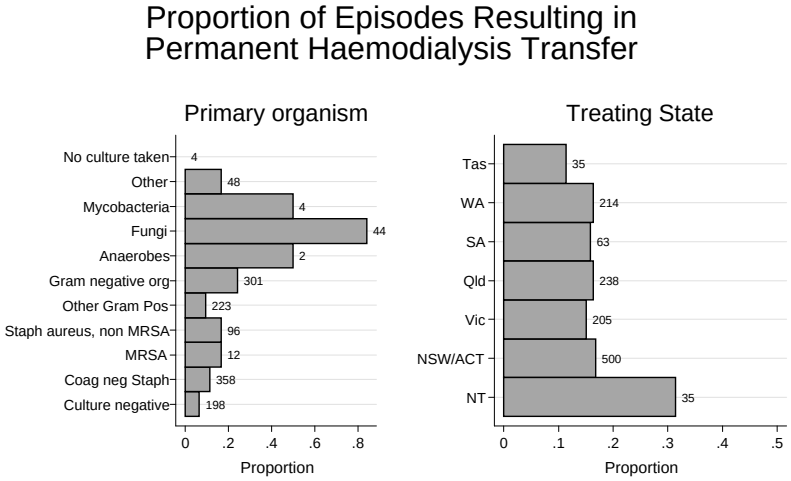
Figure 6.59



OUTCOMES

There is a strong relationship between the type of organism and the rate of transfer to permanent haemodialysis. After fungal, mycobacterial or gram negative peritonitis, there is a considerably higher rate.

Figure 6.60

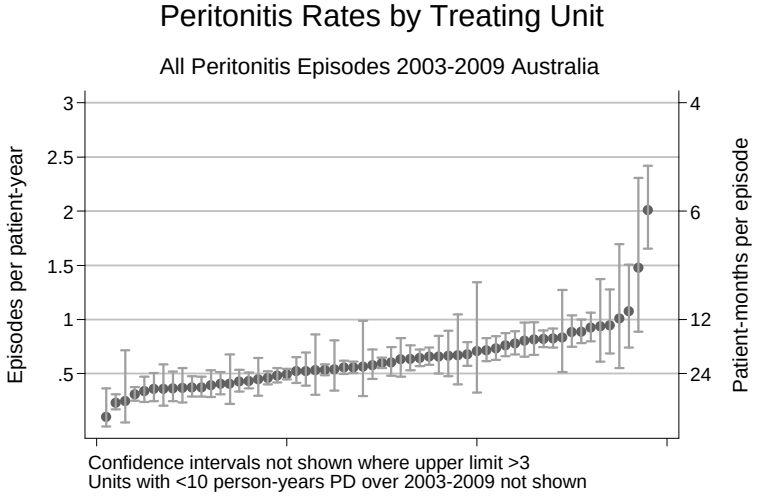


Values are total number of peritonitis episodes reported 1/1/09-31/12/09

RATES OF PERITONITIS ACROSS INDIVIDUAL UNITS

Figure 6.61 shows the peritonitis rates for all units in Australia over the period 1st October, 2003 to 31st December 2009. Only units who averaged at least ten patient-years of peritonitis treatment per year over that period are included. There is substantial variation in the rates between units.

Figure 6.61



As demonstrated in Figure 6.62 there remains over a threefold variation in peritonitis rates between units. There are a number of individual characteristics which predict the occurrence of peritonitis, including older age, diabetes, cigarette smoking (but not centre size) and Aboriginal racial origin. These are covered in greater detail in a manuscript in Peritoneal Dialysis International (Ghali et al Perit Dial Inter 2011: In Press). Similarly, there remains considerable variation between units (Figure 6.62), and between States (Figure 6.63).

Figure 6.62

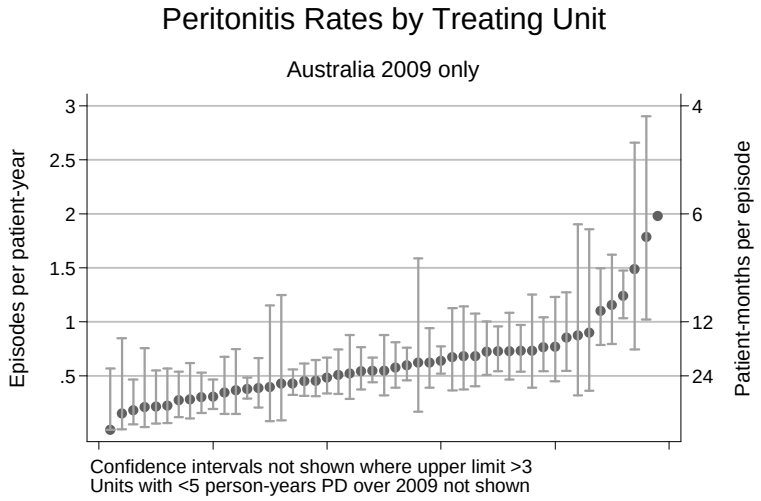
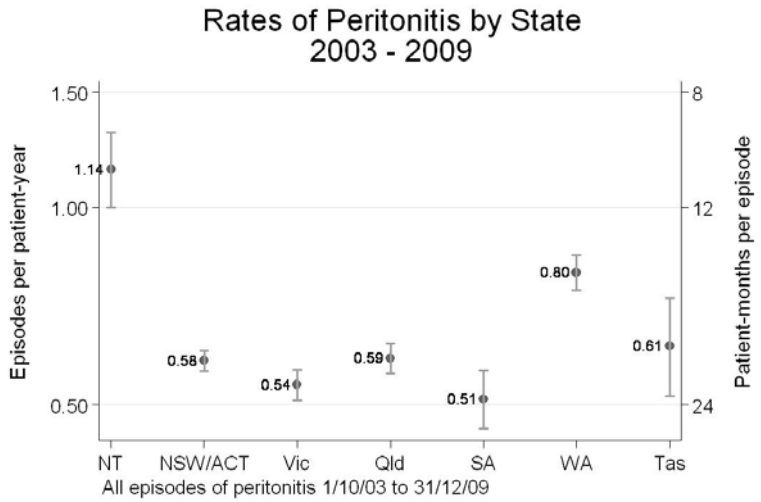


Figure 6.63



HAEMOGLOBIN

In Australia, at the end of 2009, haemoglobin was between 110-119 in 28% of PD patients, <110 g/L in 37%, higher than in previous years, and >140 g/L in 4%, which is lower than previous years.

In New Zealand, the corresponding percentages are very similar - 28%, 39% and 4% respectively.

Figure 6.65 shows the Hb levels in PD patients with proven or likely coronary artery disease or not.

Figure 6.64

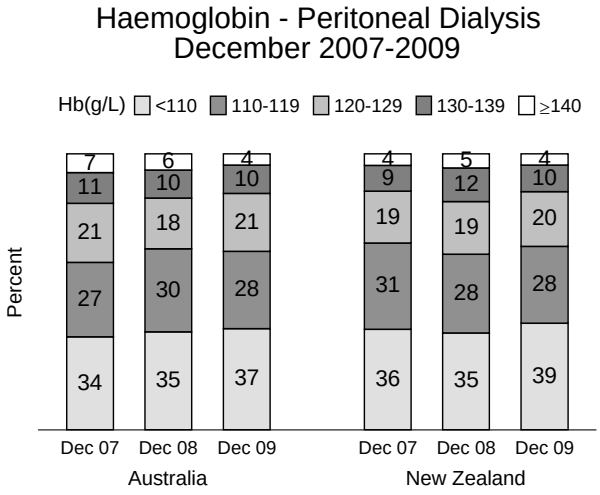
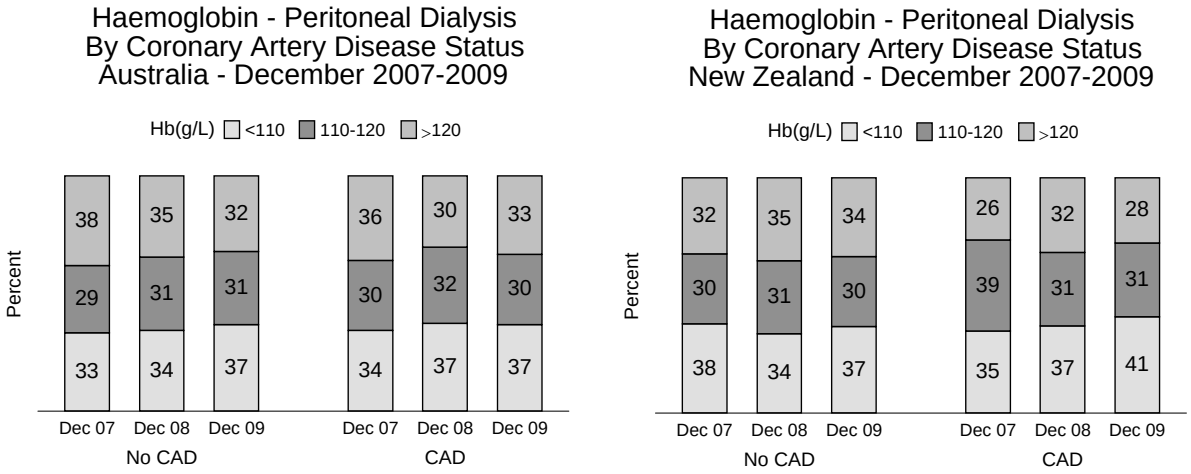


Figure 6.65



HAEMOGLOBIN IN PERITONEAL DIALYSIS PATIENTS BY TREATING CENTRE

Figures 6.66 - 6.69

These figures show the median haemoglobin (with inter-quartile range) for individual centres, arranged from lowest to highest (Figures 6.66 and 6.67). Also shown are the proportion of patients in each centre with a haemoglobin of 110-129 g/L (Figures 6.68 and 6.69).

In Australia, median haemoglobin for each centre ranged from 108 to 124 g/L for peritoneal dialysis patients and in New Zealand 107-125 g/L.

The proportion of patients in Australia with a haemoglobin of 110-129 g/L in each centre ranged from 30% to 76% for peritoneal dialysis patients and for New Zealand 31% to 67%. This large variation probably may reflect differences in practices, protocols and patient case-mix among centres.

Figure 6.66

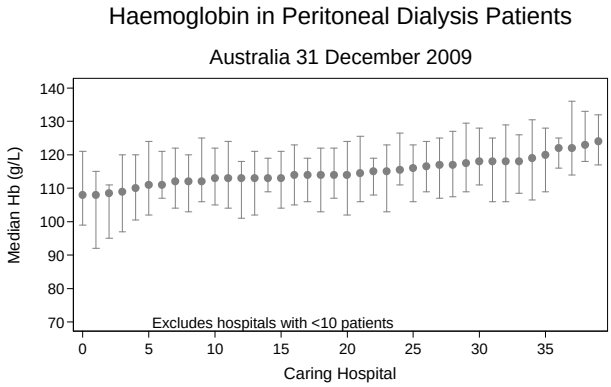


Figure 6.67

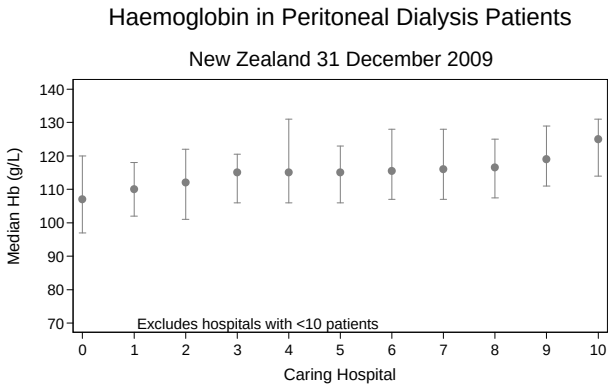


Figure 6.68

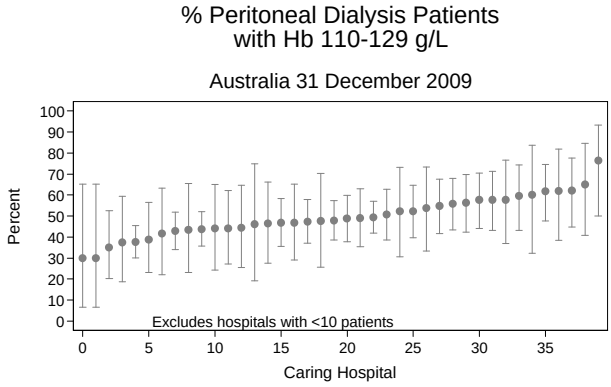
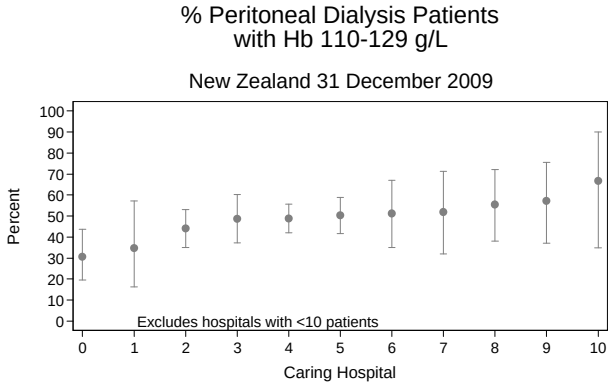


Figure 6.69



FERRITIN AND TRANSFERRIN SATURATION

Figures 6.70 - 6.71

In Australia and New Zealand the proportions of peritoneal dialysis patients with ferritin < 200 mcg/L have slightly increased to 17% in Australia and 15% in New Zealand, while those with ferritin ≥ 500 mcg/L are 26% in Australia and 25% in New Zealand.

In both Australia and New Zealand, distributions of transferrin saturation have been unchanged for the past three years, although in 2009 there was a slight decrease in the proportion of peritoneal dialysis patients with transferrin saturation < 20% in Australia to 30%.

Figure 6.70

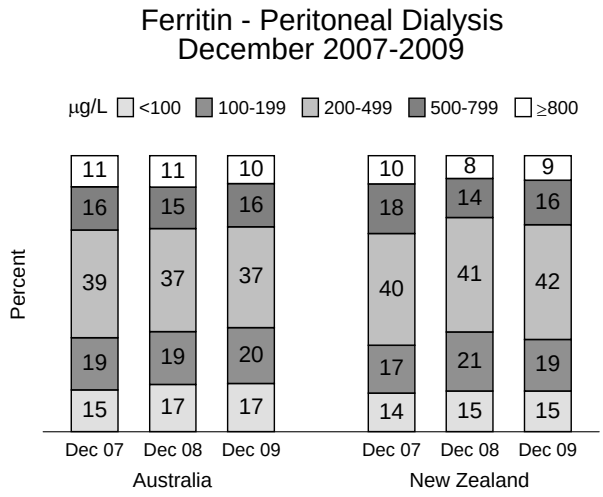
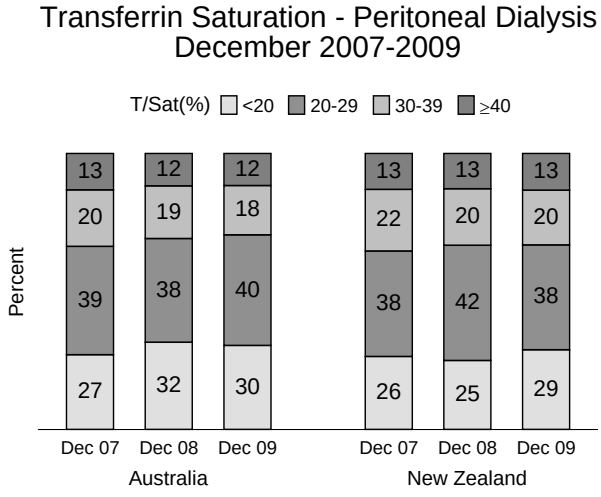


Figure 6.71



FERRITIN BY TREATING CENTRE

Figures 6.72 - 6.75

These figures show the proportions of patients in each centre with ferritin between 200-500 mcg/L and transferrin saturation of >20% respectively, as recommended by the CARI guidelines.

In Australia, the proportions of patients with ferritin within this range in each centre varied widely between 08-60% for peritoneal dialysis patients. Similarly large variations between centres were seen for transferrin saturation, between 36-100%. Again, this large variation may reflect differences n practices, protocols and patient case-mix among centres.

In New Zealand, the corresponding figures for ferritin were between 08-51% for peritoneal dialysis patients and for transferrin saturation between 43-79%. In both countries, significant proportions of patients did not have ferritin and transferrin saturation within the recommended ranges.

Figure 6.72

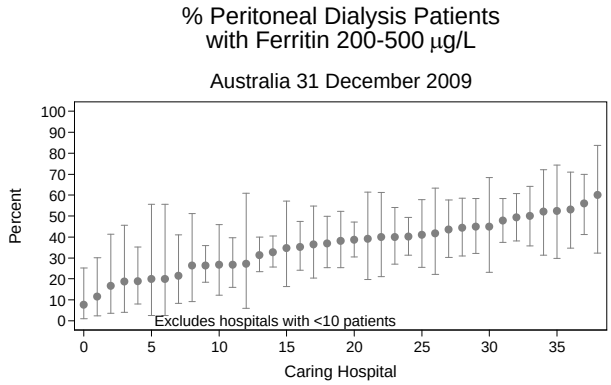


Figure 6.73

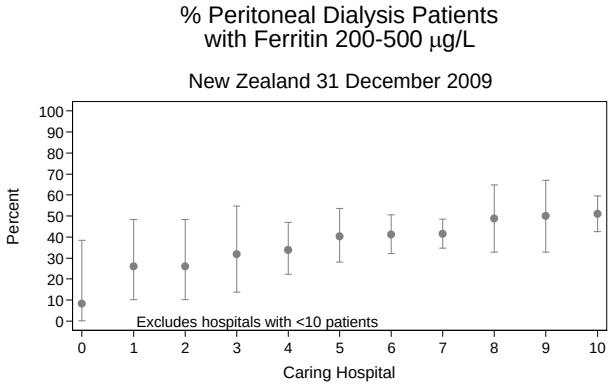


Figure 6.74

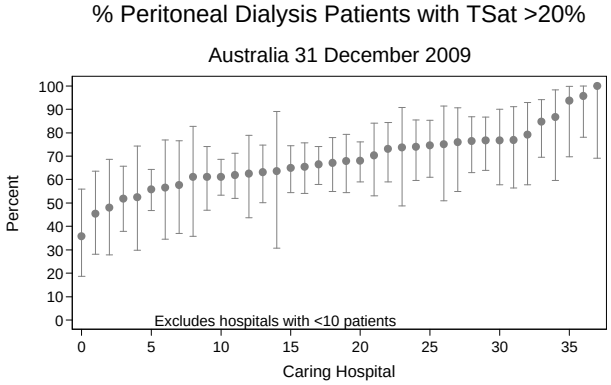
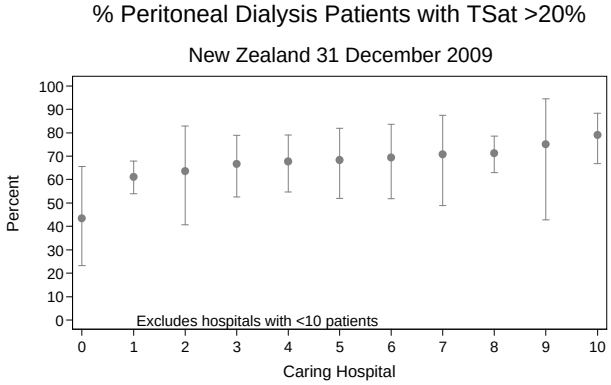


Figure 6.75

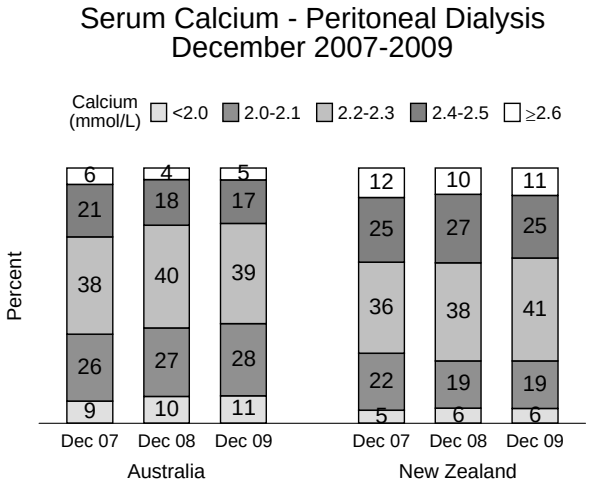


SERUM CALCIUM

Figure 6.76

In both Australia and New Zealand the proportions of patients with proportions with serum calcium ≥2.4 mmol/L have decreased over the past three years, while those with < 2.2 mmol/L have increased in Australia, but remained fairly stable in New Zealand.

Figure 6.76



SERUM CALCIUM BY TREATING CENTRE

Figures 6.77 and 6.78 show the proportions of patients at each centre with serum calcium 2.1-2.4 mmol/L, as recommended by the CARI guidelines. Note however that the values in the guidelines were for corrected total calcium, while those in this report are for uncorrected total calcium.

In Australia, the proportions ranged widely between 30-84% for peritoneal dialysis patients, while in New Zealand the corresponding proportions were 42-70%.

Figure 6.77

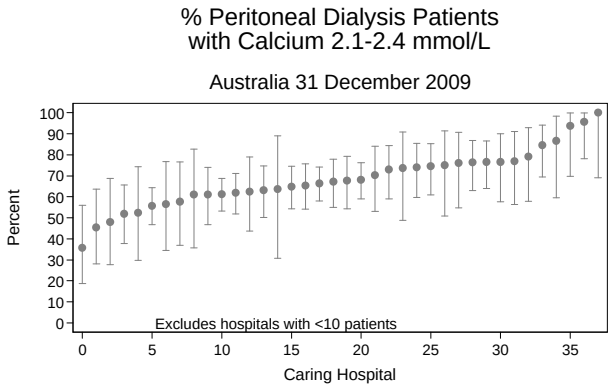
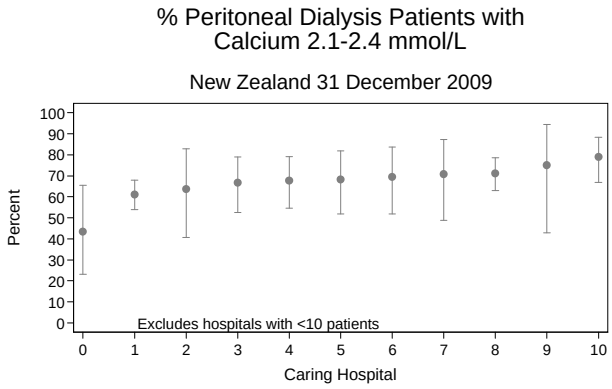


Figure 6.78



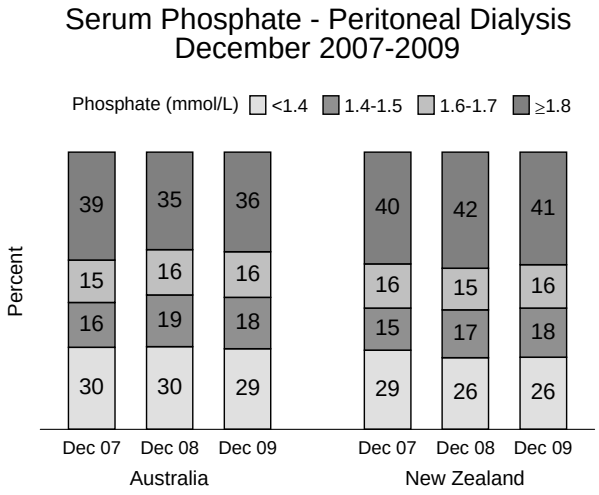
SERUM PHOSPHATE

Figure 6.79

In Australia, serum phosphate has decreased slightly over the last three years (reflected in the size of the ≥ 1.8 mmol/L group).

In New Zealand, the proportions with serum phosphate ≥ 1.8 mmol/L have remained stable.

Figure 6.79



SERUM PHOSPHATE BY TREATING CENTRE

Figures 6.80 - 6.81 show the proportions of patients at each centre with serum phosphate 0.8-1.6 mmol/L, as recommended by the CARI guidelines.

In Australia, the proportions ranged widely between 30-73% for peritoneal dialysis patients and in New Zealand, the corresponding proportions were 25-70%.

Figure 6.80

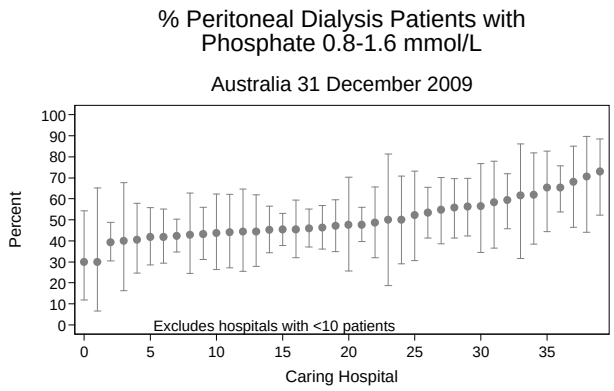
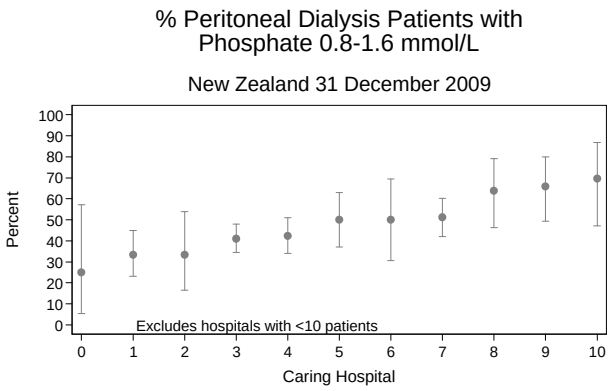


Figure 6.81



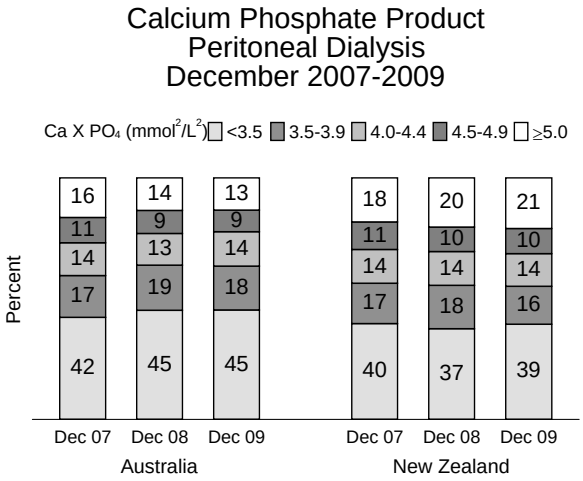
CALCIUM-PHOSPHATE PRODUCT

Figure 6.82

In both Australia and New Zealand, calcium-phosphate product has continued to improve, with smaller proportions of patients with a product ≥ 5.0 mmol^2/l^2.

Overall, the proportion of people with high calcium-phosphate product was higher in New Zealand than Australia.

Figure 6.82



CALCIUM-PHOSPHATE PRODUCT BY TREATING CENTRE

Figures 6.83 - 6.84 show the proportions of patients at each centre with calcium-phosphate product <4.0 mmol^2/L^2, as recommended by the CARI guidelines.

In Australia, the proportions ranged widely between 40-82% for peritoneal dialysis patients while in New Zealand, the corresponding proportions were 33-83%.

Figure 6.83

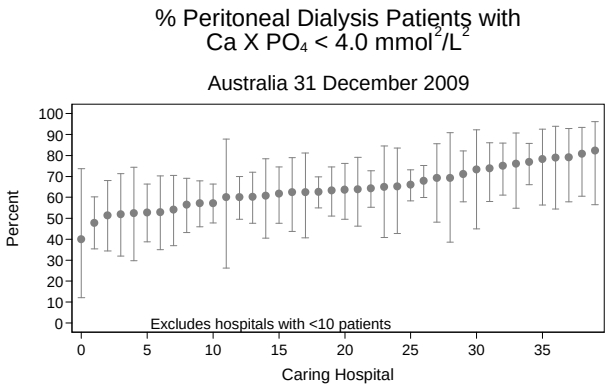
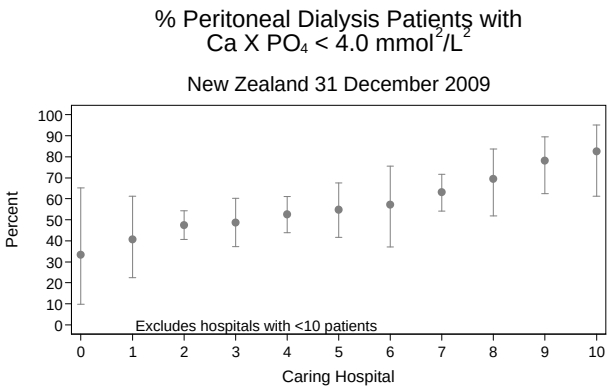


Figure 6.84



CHAPTER 7

TRANSPLANT WAITING LIST

Nancy Briggs
Leonie Excell
Stephen McDonald

The methods ANZDATA uses to collect transplant waiting list data changed in 2006. Rather than rely on units contributing individual data, we now collaborate with the National Organ Matching System (an Australian Government funded project) which supplies the Australian waiting list data and Organ Donation New Zealand which supplies the New Zealand waiting list data. This is cross-checked against ANZDATA records. The data in this Report includes people on the waiting list for a donor kidney transplant at 31st December 2009.

The National Organ Matching System maintains a separate waiting list for each State transplant region (Qld, NSW/ACT, Vic/Tas, SA/NT and WA) which determine their own acceptance criteria. Deceased donor kidneys are then allocated using the National Organ Matching System at two levels - there is a national scheme for very well matched kidneys and sensitised recipients: each region also has their own State-based allocation scheme.

AUSTRALIA

The number of patients receiving dialysis who were on the transplant waiting list at 31st December 2009 was 1,105, 11% of the 10,341 patients dialysing, (compared to 13% at 31st December 2008). Among the States, the proportion of patients on dialysis awaiting transplantation ranged from 20% in the ACT to 1% in the Northern Territory (Figure 7.1).

Of those on the waiting list; 888 (80%) were waiting for their first transplant and 217 (20%) had received a previous transplant (Figure 7.1).

The highest proportion awaiting transplantation was among satellite haemodialysis (36%), followed by home haemodialysis (26%), automated peritoneal dialysis (21%), hospital haemodialysis (11%) and continuous ambulatory peritoneal dialysis (6%) (Figure 7.4).

In the age group < 65 years, 977 (18%) of 5,288 patients were on the waiting list. The State ratios ranged from the ACT (30%), New South Wales (27%), Victoria (23%), Tasmania (13%), Western Australia (12%), Queensland (11%), South Australia (10%) and the Northern Territory (<1%) (Figure 7.3). These proportions need to be interpreted in the light of different transplant rates between States, and different acceptance and allocation criteria.

In the age groups ≥ 65 years, 128 (3%) of 5,053 patients and in the group < 55 years, 666 (22 %) of 3,055 patients were on the waiting list.

The proportion of the age group <55 years in each State ranged from the ACT (38%), New South Wales (33%), Victoria (27 %), Western Australia (16%), Tasmania (15%), Queensland (13%), South Australia (10%) and the Northern Territory (<1%).

Of the 977 patients < 65 years on the waiting list in Australia at 31st December 2009, 39 patients (4%) were Aboriginal/Torres Strait Islander patients; residing in Western Australia (36%), New South Wales (33%), Queensland (15%), South Australia (8%), the Northern Territory, the ACT and Victoria (3% each) and Tasmania none.

NEW ZEALAND

There were 2,260 patients dialysing at 31st December 2009, with 329 (15%) on the transplant waiting list, compared to 14% in 2008). Eighty two percent (271) of patients were waiting for their first transplant (12% of all patients on dialysis).

Of patients < 55 years old, 192 (22 %) of 886 patients were waiting for a transplant. In the age groups < 65 years old, 293 (20%) of 1,449 patients and for the ≥ 65 years old group, 36 (5%) of 761 patients were on the transplant waiting list.

There were 62 (21%) Maori patients, 46 (16%) of Pacific People and 37 (13%) Asians < 65 years old on the waiting list (Figure 7.3).

Figure 7.1

Patients on the Waiting List 31-Dec-2009
Related to Previous Transplantation
(Patients Dialysing)

Transplant Category	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
No Previous Transplant	99 (5%)	421 (12%)	38 (16%)	239 (10%)	12 (6%)	17 (3%)	2 (<1%)	60 (6%)	**888 (9%)**	**271 (12%)**
Previous Transplant	25 (1%)	87 (3%)	10 (4%)	61 (2%)	3 (2%)	18 (3%)	1 (<1%)	12 (1%)	**217 (2%)**	**12 (1%)**
Total Waiting	**124 (6%)**	**508 (15%)**	**48 (20%)**	**300 (12%)**	**15 (8%)**	**35 (5%)**	**3 (1%)**	**72 (7%)**	**1105 (11%)**	**329 (15%)**
(Patients Dialysing)	1944	3374	239	2513	194	670	418	989	**10,341**	**2,260**

Figure 7.2

Patients on the Waiting List 31-Dec-2009 By Age Group
(Patients Dialysing)

Age Groups	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
00-04 years	0 (0)	0 (4)	0 (0)	0 (3)	0 (0)	0 (1)	0 (0)	0 (0)	0 (8)	1 (3)
05-14 years	0 (6)	4 (9)	0 (0)	2 (9)	0 (0)	0 (1)	0 (0)	0 (4)	6 (29)	4 (10)
15-24 years	5 (28)	16 (47)	0 (2)	6 (33)	0 (6)	0 (8)	0 (5)	3 (15)	30 (144)	11 (68)
25-34 years	16 (87)	42 (123)	3 (10)	15 (70)	1 (3)	4 (19)	1 (20)	10 (50)	92 (382)	37 (123)
35-44 years	17 (154)	85 (245)	12 (23)	63 (193)	2 (17)	7 (51)	0 (81)	17 (90)	203 (854)	44 (220)
45-54 years	42 (320)	151 (485)	8 (26)	97 (378)	8 (45)	6 (82)	1 (136)	22 (166)	335 (1638)	95 (462)
55-64 years	33 (418)	141 (716)	12 (54)	92 (524)	4 (41)	12 (127)	1 (133)	16 (220)	311 (2233)	101 (613)
65-74 years	10 (447)	67 (876)	11 (65)	25 (670)	0 (43)	6 (170)	0 (40)	4 (227)	123 (2538)	34 (524)
75-84 years	1 (388)	2 (755)	2 (50)	0 (557)	0 (33)	0 (184)	0 (3)	0 (185)	5 (2155)	2 (216)
>=85 years	0 (96)	0 (114)	0 (9)	0 (76)	0 (6)	0 (27)	0 (0)	0 (32)	0 (360)	0 (21)
Total	**124 (1944)**	**508 (3374)**	**48 (239)**	**300 (2513)**	**15 (194)**	**35 (670)**	**3 (418)**	**72 (989)**	**1105 (10,341)**	**329 (2,260)**

Figure 7.3

Patients on Waiting List Related to Race and Age <65 Years
31-Dec-2009 (Patients Dialysing)

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
Caucasoid	89	313	30	206	14	24	1	39	**716**	**147**
Aboriginal/TSI	6	13	1	1	0	3	1	14	**39**	**0**
Maori	1	5	0	2	0	1	0	0	**9**	**62**
Pacific People	2	15	0	5	0	0	0	1	**23**	**46**
Asian	13	78	3	52	1	1	1	12	**161**	**37**
Other	2	15	1	9	0	0	0	2	**29**	**1**
Total	**113 (1013)**	**439 (1629)**	**35 (115)**	**275 (1210)**	**15 (112)**	**29 (289)**	**3 (375)**	**68 (545)**	**977 (5,288)**	**293 (1,499)**

Figure 7.4

All Patients on the Waiting List Related to Treatment 31-Dec-2009

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
APD	23	126	2	51	2	6	1	17	**228**	**74**
Hospital HD	39	55	1	10	9	5	0	2	**121**	**35**
Home HD	35	171	11	62	2	2	1	6	**290**	**99**
Satellite HD	16	126	32	160	2	21	1	39	**397**	**58**
CAPD	11	30	2	17	0	1	0	8	**69**	**63**
Total	**124**	**508**	**48**	**300**	**15**	**35**	**3**	**72**	**1105**	**329**

CHAPTER 8

TRANSPLANTATION

Philip Clayton
Leonie Excell
Scott Campbell
Stephen McDonald
Steven Chadban

TRANSPLANTS PERFORMED IN 2009

Figure 8.1

Number of Kidney Transplant Operations
Total (Living Donors)

Year	Australia						New Zealand				
	1st	2nd	3rd	4th	5th	Total	1st	2nd	3rd	4th	Total
1963	5	1	0	0	0	**6 (1)**	0	0	0	0	**0**
1964	2	0	0	0	0	**2 (0)**	0	0	0	0	**0**
1965	12	1	1	0	0	**14 (3)**	1	0	0	0	**1 (1)**
1966	18	2	0	0	0	**20 (5)**	10	3	0	0	**13 (0)**
1967	69	2	0	0	0	**71 (2)**	18	4	1	0	**23 (1)**
1968	97	10	0	0	0	**107 (0)**	17	4	0	0	**21 (2)**
1969	149	12	0	0	0	**161 (0)**	39	5	0	0	**44 (0)**
1970	168	12	2	0	0	**182 (1)**	21	3	1	0	**25 (0)**
1971	207	22	1	0	0	**230 (1)**	26	6	0	0	**32 (1)**
1972	183	16	0	0	0	**199 (2)**	43	8	0	0	**51 (1)**
1973	213	30	1	0	0	**244 (7)**	50	10	2	0	**62 (0)**
1974	224	35	4	0	0	**263 (6)**	35	5	1	0	**41 (3)**
1975	271	29	3	1	0	**304 (7)**	61	13	0	0	**74 (2)**
1976	223	41	4	0	0	**268 (10)**	38	13	1	0	**52 (1)**
1977	265	57	4	0	0	**326 (16)**	46	10	2	0	**58 (4)**
1978	269	43	2	0	0	**314 (17)**	43	11	3	0	**57 (11)**
1979	293	35	5	0	0	**333 (14)**	61	13	3	2	**79 (16)**
1980	287	63	9	0	0	**359 (36)**	57	13	4	0	**74 (18)**
1981	306	58	9	1	0	**374 (35)**	51	8	1	0	**60 (10)**
1982	321	72	6	0	0	**399 (53)**	48	17	0	0	**65 (8)**
1983	272	63	10	2	0	**347 (48)**	69	25	4	0	**98 (11)**
1984	362	72	10	1	0	**445 (48)**	63	11	0	0	**74 (16)**
1985	318	79	17	1	0	**415 (36)**	60	25	3	0	**88 (6)**
1986	366	63	7	2	0	**438 (32)**	79	19	6	1	**105 (13)**
1987	310	58	21	3	0	**392 (40)**	57	17	4	1	**79 (20)**
1988	391	62	10	2	1	**466 (46)**	61	11	6	0	**78 (8)**
1989	433	46	10	2	0	**491 (48)**	71	11	1	0	**83 (12)**
1990	387	45	9	2	0	**443 (59)**	86	14	2	0	**102 (23)**
1991	386	70	11	3	0	**470 (78)**	62	10	4	1	**77 (13)**
1992	404	57	13	3	0	**477 (70)**	105	5	5	0	**115 (17)**
1993	385	63	6	4	1	**459 (66)**	69	13	2	0	**84 (20)**
1994	384	41	12	2	1	**440 (103)**	70	11	1	1	**83 (20)**
1995	371	60	11	0	0	**442 (94)**	84	7	3	0	**94 (24)**
1996	416	50	9	0	0	**475 (115)**	88	7	1	0	**96 (26)**
1997	444	51	6	1	0	**505 (147)**	101	10	1	0	**112 (31)**
1998	443	62	11	2	0	**518 (161)**	95	10	1	0	**106 (31)**
1999	403	43	9	0	0	**455 (169)**	97	11	4	0	**112 (42)**
2000	476	47	7	1	0	**531 (181)**	91	13	2	0	**106 (31)**
2001	488	45	6	2	0	**541 (213)**	101	9	0	0	**110 (43)**
2002	537	60	5	2	0	**604 (230)**	103	12	2	0	**117 (48)**
2003	472	60	10	1	0	**543 (218)**	94	13	4	0	**111 (44)**
2004	583	53	11	3	0	**650 (244)**	98	7	0	0	**105 (48)**
2005	539	67	15	2	0	**623 (246)**	87	5	0	1	**93 (46)**
2006	549	70	17	5	0	**641 (273)**	80	8	2	0	**90 (49)**
2007	527	75	11	0	2	**615 (271)**	112	9	2	0	**123 (58)**
2008	708	84	16	5	0	**813 (354)**	111	10	1	0	**122 (69)**
2009	673	88	11	0	0	**772 (326)**	109	12	0	0	**121 (67)**

AUSTRALIA

The 772 transplant operations performed in 2009 represents a decrease of 5% compared with 2008 (813 operations, an historic high) (Figure 8.1). This represents a transplant rate of 35 per million population per year, compared with 38 per million in 2008. There was a decrease of 8% for living donors from 2008 (326 from 354) (Figure 8.2). There has been a large increase in the number of kidney transplants from non-heart beating donors (Figure 8.4); in 2009 such kidneys accounted for 17% of deceased donor kidney transplants.

For more up to date figures on the deceased organ donor rate, see www.anzdata.org.au/anzod/updates/anzodupdate.htm

Living donor transplants accounted for 42% (326 grafts) in 2009, down from 44% in both 2008 (354 grafts) and 2007 (271 grafts).

Primary recipients (those receiving a first transplant) received 87% of all kidneys transplanted in 2009, similar to 2008 and 2007.

NEW ZEALAND

The number of transplant operations (121) performed in 2009 represents a transplant rate of 28 per million population per year compared with 29 in 2008 (Figure 8.1).

The percentage of living donors remained steady at 55% of all operations in 2009 (Figure 8.3). Only three transplants were from non-heart beating donors in 2009.

Of the grafts performed in 2009, 90% were to primary recipients, a proportion that has been relatively steady for the last six years.

Figure 8.2

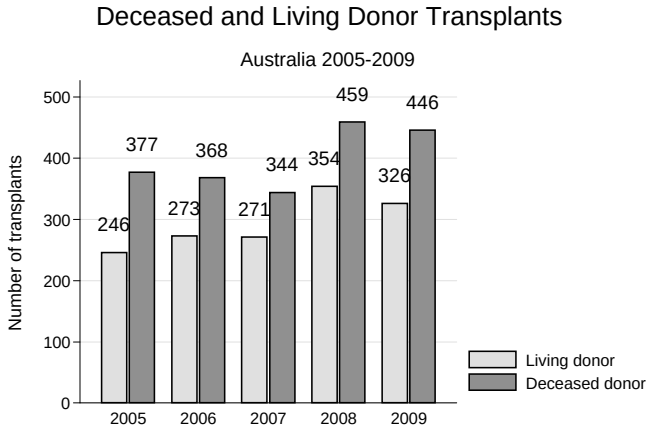


Figure 8.3

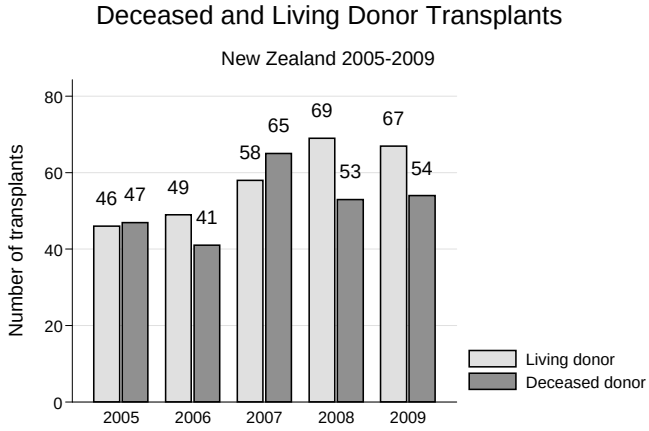
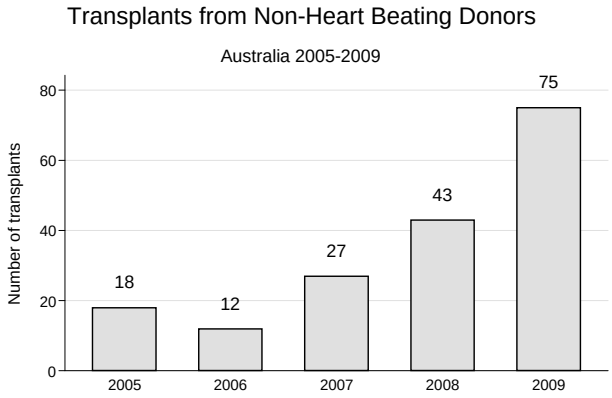


Figure 8.4



TRANSPLANT RATE OF PATIENTS DIALYSED

In Australia transplantation was the mode of RRT for 772 of 12,676 (6.1%) of patients who would have otherwise been managed with dialysis in 2009. This ratio of 6.1% represents a decrease from 6.5% in 2008 but an increase from 5.2% in 2007 (Figure 8.5).

Of all patients in the 15-64 year age group who received dialysis treatment during 2009, 10.3% (685 patients) were transplanted in 2009, compared with 11.0% (724 patients) in 2008 (Figure 8.6).

In New Zealand, transplantation was the mode of RRT for 121 of 2,701 (4.5%) of patients, compared with 4.7% in 2008 (Figure 8.5).

The ratio of transplantation to numbers dialysing in Australia was the highest in the age group 5-14 years (50%) and 0-4 years of age (34%) and continued to decline with increasing age (Figure 8.7).

As in Australia, the rate of transplantation for New Zealand patients was highest among those less than 14 years old and declined with age (Figure 8.8).

Figure 8.5

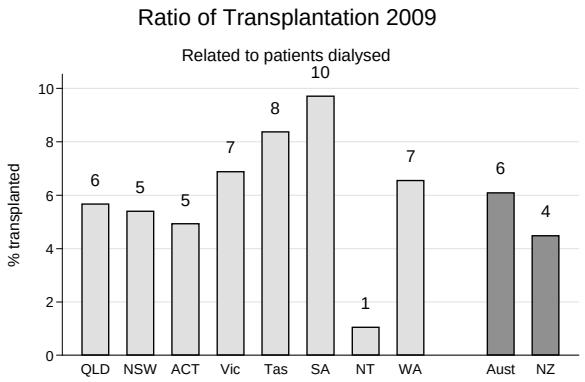


Figure 8.6

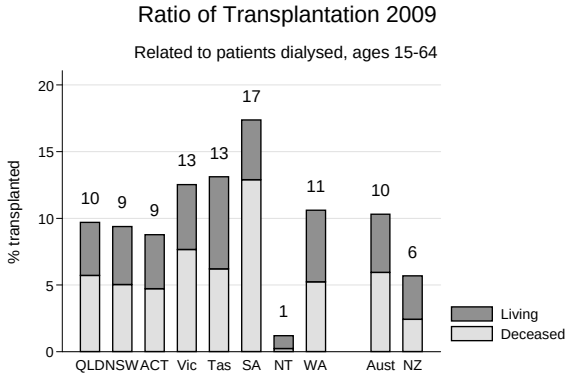


Figure 8.7

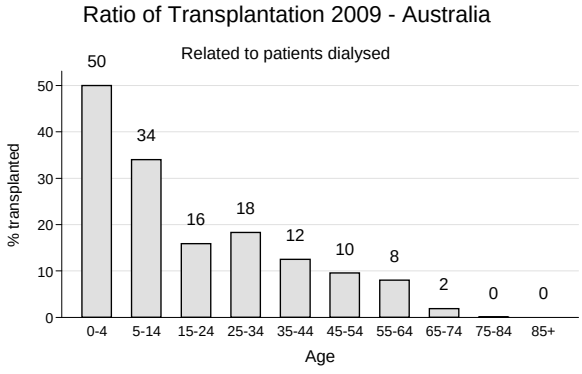
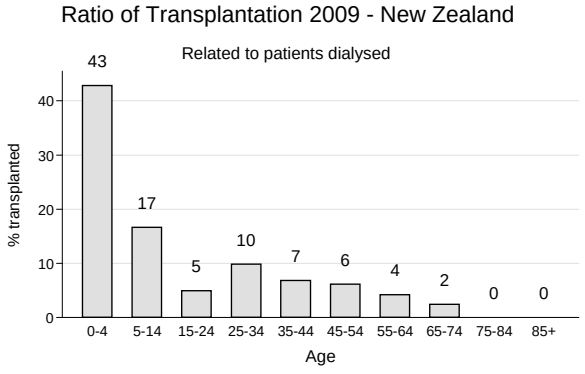


Figure 8.8



* Preemptive transplant patients included

AGE OF RECIPIENTS TRANSPLANTED IN 2009

Figure 8.9

Graft Number and Age of Patients Transplanted 2009

Donor Source	Graft No.	Age Groups									Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	
Australia											
Deceased	1	4	5	5	34	66	100	125	35	2	**376**
	2	1	0	4	7	18	16	14	3	0	**63**
	3	0	0	0	3	0	3	1	0	0	**7**
Living Donor	1	6	12	23	41	47	71	78	19	0	**297**
	2	0	0	1	8	9	4	3	0	0	**25**
	3	0	0	0	2	1	1	0	0	0	**4**
Total		**11**	**17**	**33**	**95**	**141**	**195**	**221**	**57**	**2**	**772**
New Zealand											
Deceased	1	1	0	0	5	7	13	14	10	0	**50**
	2	0	0	0	0	3	1	0	0	0	**4**
Living Donor	1	2	2	3	6	7	19	15	5	0	**59**
	2	0	0	1	3	2	1	1	0	0	**8**
Total		**3**	**2**	**4**	**14**	**19**	**34**	**30**	**15**	**0**	**121**

AUSTRALIA

The median age of transplant recipients in 2009 was 49 years, compared with 48 years in 2008. The age range was 1 to 83 years (Figures 8.9 and 8.10).

Forty-four percent of recipients were in the 35-54 year age group. Thirty-six percent of recipients in 2009 were over 54 years of age, compared with 32% in 2008.

The transplantation rate per million for each age group and as a percentage of dialysed patients for each age group is shown in Figures 8.7 and 8.10.

NEW ZEALAND

The median age of transplant recipients in 2009 was 49 years compared with 45.5 years in 2008. The age range was 1 to 72 years (Figures 8.9 and 8.11).

Recipients aged between 35 and 54 years comprised 48% of the total. Thirty-seven percent of recipients were over 54 years of age in 2009.

Figure 8.10

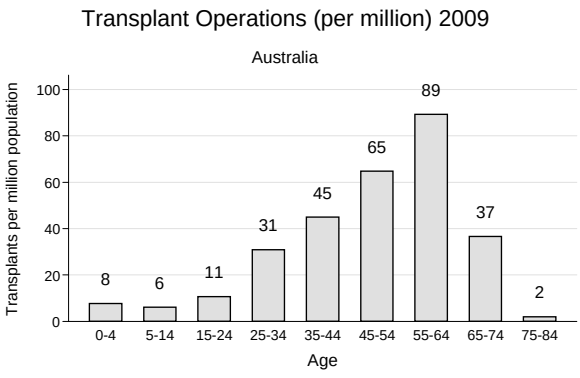
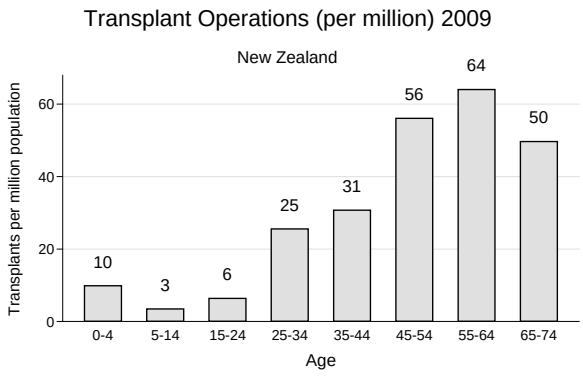


Figure 8.11



ETHNICITY OF TRANSPLANT RECIPIENTS

AUSTRALIA

Figure 8.12.

For the 15-64 year age group in 2009, 12.9% of dialysed Caucasoid patients were transplanted. For Australian Aboriginals and Torres Strait Islanders (ATSI), the numbers receiving transplants remains low.

In contrast, the number of ATSI patients dialysed continues to increase each year.

Figure 8.12 Australia

Transplantation Rate - Age Group 15-64 years
2000 - 2009

Year	Caucasoid			Aboriginal and Torres St. Islanders			All Patients		
	Dialysed	Tx	Rate	Dialysed	Tx	Rate	Dialysed	Tx	Rate
2000	3539	429	12.1%	613	18	2.9%	4725	490	10.4%
2001	3672	433	11.8%	675	21	3.1%	4952	503	10.2%
2002	3722	479	12.9%	729	17	2.3%	5085	549	10.8%
2003	3787	414	10.9%	783	12	1.5%	5247	478	9.1%
2004	3869	491	12.7%	856	25	2.9%	5432	581	10.7%
2005	4038	459	11.4%	928	20	2.2%	5709	547	9.6%
2006	4235	480	11.3%	987	27	2.7%	6028	578	9.6%
2007	4375	471	10.8%	1061	17	1.6%	6319	557	8.8%
2008	4476	602	13.4%	1171	29	2.5%	6610	724	11.0%
2009	4449	572	12.9%	1187	23	1.9%	6641	685	10.3%

NEW ZEALAND

Figure 8.13.

Amongst the 15-64 year age group, the proportion of Maori and Pacific People who received a renal transplant in 2009 was substantially lower than other groups.

Figure 8.13 New Zealand

Transplantation Rate - Age Group 15-64 years 2000 - 2009

Year	Caucasoid			Maori			Pacific People			All Patients		
	Dialysed	Tx	Rate	Dialysed	Tx	Rate	Dialysed	Tx	Rate	Dialysed	Tx	Rate
2000	481	72	15.0%	423	12	2.8%	236	4	1.7%	1216	95	7.8%
2001	511	71	13.9%	465	15	3.2%	267	5	1.9%	1328	101	7.6%
2002	541	70	12.9%	494	12	2.4%	267	15	5.6%	1397	102	7.3%
2003	545	64	11.7%	530	16	3.0%	271	13	4.8%	1441	101	7.0%
2004	541	65	12.0%	558	10	1.8%	285	12	4.2%	1482	96	6.5%
2005	569	73	12.8%	563	3	0.5%	303	3	1.0%	1523	82	5.4%
2006	569	59	10.4%	606	9	1.5%	322	5	1.6%	1600	80	5.0%
2007	577	82	14.2%	617	15	2.4%	343	6	1.7%	1648	111	6.7%
2008	587	84	14.3%	619	12	1.9%	375	9	2.4%	1696	112	6.6%
2009	599	77	12.9%	631	13	2.1%	403	6	1.5%	1772	101	5.7%

AUSTRALIA AND NEW ZEALAND

Figure 8.14 shows this data another way.

In Australia in 2009, 3% of transplant recipients were of Aboriginal/TSI ethnicity.

In New Zealand, 16% of transplant recipients were Maoris and 5% were Pacific People.

Figure 8.14

New Transplanted Patients 2005 - 2009
Related to Ethnicity

Race	2005	2006	2007	2008	2009
Australia	**(623)**	**(641)**	**(615)**	**(813)**	**(772)**
Caucasoid	526 (84.4%)	537 (83.8%)	524 (85.2%)	675 (83%)	650 (84.2%)
Aboriginal/Torres St. Islanders	22 (3.5%)	27 (4.2%)	18 (2.9%)	31 (3.8%)	24 (3.1%)
Asian	59 (9.5%)	59 (9.2%)	56 (9.1%)	83 (10.2%)	75 (9.7%)
Other	16 (2.6%)	18 (2.8%)	17 (2.8%)	24 (3%)	23 (3%)
New Zealand	**(93)**	**(90)**	**(123)**	**(122)**	**(121)**
Caucasoid	83 (89%)	65 (72.2%)	91 (74%)	93 (76.2%)	91 (75.2%)
Maori	3 (3.2%)	10 (11.1%)	17 (13.8%)	12 (9.8%)	19 (15.7%)
Pacific People	4 (4.3%)	7 (7.8%)	6 (4.9%)	10 (8.2%)	6 (5%)
Asian	3 (3.2%)	8 (8.9%)	9 (7.3%)	7 (5.7%)	5 (4.1%)
Other	-	-	-	-	-

AUSTRALIAN REGIONAL TRANSPLANTATION ACTIVITY 2009

Figure 8.15

Transplants in each Region 2005 - 2009
Number of Operations
(per Million Population per year)

State	2005	2006	2007	2008	2009
Queensland	99 (25)	101 (25)	114 (27)	136 (32)	140 (32)
New South Wales / ACT *	212 (30)	195 (27)	187 (26)	243 (33)	237 (32)
Victoria / Tasmania *	162 (29)	185 (33)	183 (32)	246 (42)	233 (39)
South Australia / NT *	68 (39)	96 (55)	78 (43)	110 (60)	83 (45)
Western Australia	82 (41)	64 (31)	53 (25)	78 (36)	79 (35)
Australia	**623 (31)**	**641 (31)**	**615 (29)**	**813 (38)**	**772 (35)**

* For calculation of population related totals, the populations of these States were summed

Figure 8.16

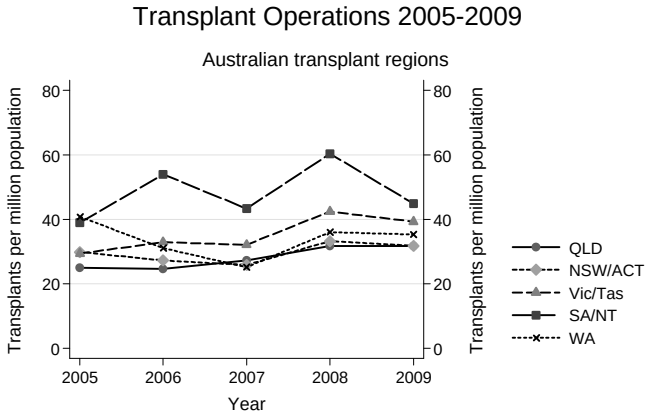
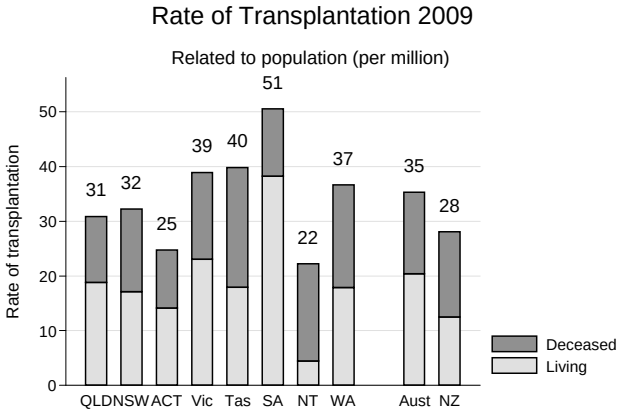


Figure 8.17



NSW population excludes residents of the Southern Area Health Service
ACT population includes residents of the Southern Area Health Service
Medical services in the ACT service the Southern Area Region

The rate of transplantation for each transplant region is shown in Figures 8.15 and 8.16.

Transplants performed for people resident in Tasmania and the Northern Territory patients are included in figures for Victoria and South Australia respectively. These regions share common waiting lists and allocation protocols.

South Australia and the Northern Territory had the highest transplant rate in 2009 (45 per million), followed by 39 per million in the Victoria/Tasmania region.

The transplant rates for residents of each State and the Northern Territory are shown in Figure 8.17. The highest rate (51 per million) occurred in South Australia, followed by Tasmania (40 per million) and Victoria (39 per million). The lowest rate (22 per million) was in the Northern Territory.

LIVING DONOR TRANSPLANTS

Figure 8.18

Living Donor Operations as a Proportion (%) of Annual Transplantation Australia 2004 - 2009

Recipient Age Groups	Year of Transplantation					
	2004	2005	2006	2007	2008	2009
00-04 years	100%	50%	100%	89%	75%	55%
05-14 years	59%	52%	55%	56%	59%	71%
15-24 years	64%	70%	71%	65%	67%	73%
25-34 years	40%	48%	48%	57%	53%	54%
35-44 years	39%	42%	37%	38%	36%	40%
45-54 years	35%	34%	37%	43%	41%	39%
55-64 years	28%	31%	40%	35%	39%	37%
65-74 years	31%	19%	41%	45%	44%	33%
75-84 years	0%	100%	0%	0%	0%	0%
All Recipients	38%	39%	43%	44%	44%	42%

Figure 8.19

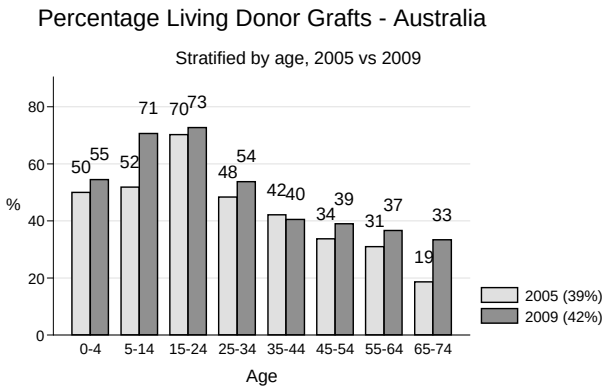
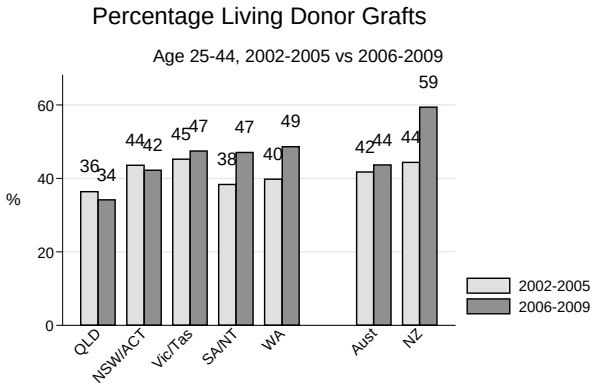


Figure 8.20



AUSTRALIA

There were 326 living donor kidney transplants performed in 2009 in Australia, representing 42% of all transplant operations. This proportion is similar as in 2006-2008 (Figures 8.2 and 8.18).

Figure 8.19 shows the age-related proportion of living donor transplants for the years 2005 and 2009. The overall proportion of living donors increased in every age group under 75 except ages 35-44. There were no living donor recipients over the age of 74.

The proportion of living donor transplants for each State and New Zealand for recipients aged 25-44 years is shown for the years 2002-2005 and 2006-2009 in Figure 8.20. Overall there has been an increase in this age group for both countries from 2002-2005 to 2006-2009, the highest in New Zealand in 2009 (59%).

The proportion of genetically unrelated donors was 44% (142 donors) in 2009 compared with 50% (177 donors) in 2008, shown in Figure 8.22. Seventy-two percent of living unrelated donors were spouses or partners. The age distribution of living donors is shown in Figure 8.21.

The first paired kidney exchange donors were transplanted in 2007 in Western Australia and there were a further five in 2008, followed by another two in 2009. There were four non directed donors in 2009. Thirty of the living donors in 2009 were blood group incompatible with the recipient, down from 36 in 2008 (Figure 8.24).

The number of related donors increased by 4% (184 donors) from 177 donors in 2008 (Figure 8.25).

NEW ZEALAND

The rate of living donor transplantation decreased by 3% (67 donors) in New Zealand in 2009, as shown in Figure 8.23.

There were 25 genetically unrelated kidney donors in 2009, compared with 31 in 2008.

Fifty-five percent of grafts were from a living donor (57% in 2008 and 47% in 2007). Unrelated donors represented 37% of all living donors in 2009, shown in Figure 8.23. Four (16%) of these were from a spouse or partner, whereas friends accounted for 52% of all unrelated donors. There were six non-directed donors in 2009 (compared with eight in 2008) (Figure 8.25).

Figure 8.21

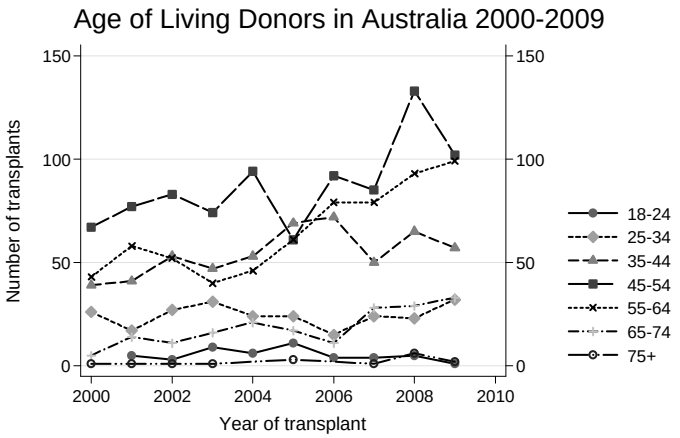


Figure 8.22

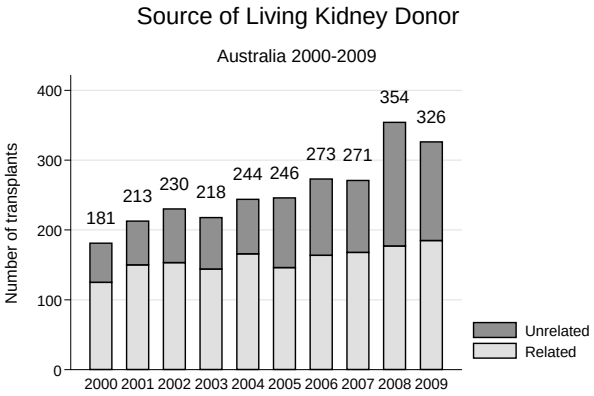


Figure 8.23

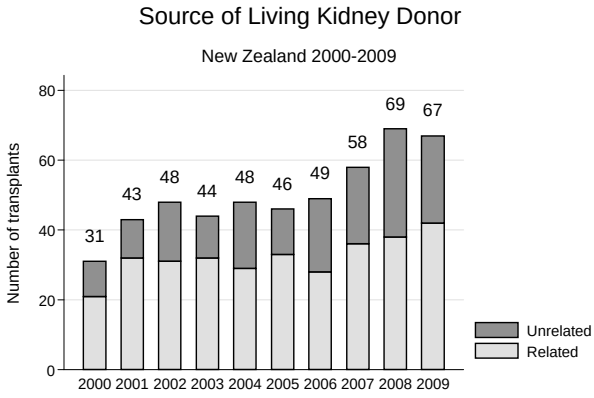


Figure 8.24

Figure 8.25

Source of Living Donor Kidneys 2005 - 2009

(x = identical twin) (+ = non identical twin)

Source	Australia					New Zealand				
	2005	2006	2007	2008	2009	2005	2006	2007	2008	2009
Total Living Donors	**246**	**273**	**271**	**354**	**326**	**46**	**49**	**58**	**69**	**67**
Related	**(146)**	**(164)**	**(168)**	**(177)**	**(184)**	**(33)**	**(28)**	**(36)**	**(38)**	**(42)**
Mother	39	40	60	46	53	7	5	5	7	5
Father	30	35	37	41	27	3	3	5	9	6
Brother	31	25	21	35	31	8	6 (1x)	5	5	12
Sister	26 (1+)	35 (1+)	29 (1+)	32 (1+)	43 (2+)	9 (1x)	6	11	8	8
Son	3	9	7	3	4	3	4	4	2	3
Daughter	5	6	3	6	4	1	3	3	1	4
Grandfather	1	2	-	-	-	-	-	-	-	-
Grandmother	1	1	-	2	5	-	-	-	-	-
Cousin	5	4	7	5	5	1	1	2	2	-
Nephew	1	-	-	-	2	-	-	1	-	-
Niece	2	1	1	-	1	-	-	-	1	2
Uncle	1	1	2	1	3	-	-	-	2	-
Aunt	1	5	1	6	6	1	-	-	1	2
Unrelated	**(100)**	**(109)**	**(103)**	**(177)**	**(142)**	**(13)**	**(21)**	**(22)**	**(31)**	**(25)**
Wife	37	53	40	64	63	-	5	8	5	2
Husband	23	17	14	35	33	-	-	5	5	1
Mother-in-Law	1	1	1	-	1	-	-	-	-	-
Father-in-Law /Adoptive Father	3	-	-	2	-	-	-	-	-	-
Son-in-Law / Adoptive Son	2	-	-	2	1	-	-	-	-	1
Stepdaughter	-	-	-	1	-	-	-	-	-	-
Stepfather	2	2	1	2	-	-	-	1	1	-
Stepmother	-	-	-	1	-	-	-	-	-	-
Sister-in-Law	3	2	2	4	4	-	1	-	1	-
Brother-in-Law	-	2	3	1	3	1	-	-	1	-
Partner	6	6	6	10	6	1	1	1	-	1
Fiance / Fiancee	-	1	-	-	-	-	-	-	-	-
Friend	14	16	15	27	18	7	10	6	10	13
Stepsister / Stepson	-	1	-	1	-	-	-	-	-	1
Non-Directed	3	2	1	6	4	3	4	1	8	6
Pathological	4	4	16	13	6	-	-	-	-	-
Paired Kidney Exchange	-	-	2	5	2	-	-	-	-	-
Other	2	2	2	3	1	1	-	-	-	-

Figure 8.26

Gender of Living Donor Kidneys 2006 - 2009

Source and State / Country of Transplant	2006			2007			2008			2009		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Related												
Queensland	50%	50%	22	41%	59%	22	35%	65%	17	31%	69%	26
New South Wales/ACT	55%	45%	55	42%	58%	59	58%	42%	62	48%	52%	65
Victoria/Tasmania	37%	63%	49	39%	61%	61	39%	61%	56	26%	74%	58
South Australia/NT	42%	58%	19	42%	58%	19	50%	50%	24	44%	56%	16
Western Australia	47%	53%	19	57%	43%	7	39%	61%	18	55%	45%	20
Australia	**46%**	**54%**	**164**	**42%**	**58%**	**168**	**47%**	**53%**	**177**	**39%**	**61%**	**185**
New Zealand	**46%**	**54%**	**28**	**42%**	**58%**	**36**	**47%**	**53%**	**38**	**50%**	**50%**	**42**
Unrelated												
Queensland	32%	68%	19	45%	55%	22	33%	67%	27	41%	59%	29
New South Wales/ACT	34%	66%	35	42%	58%	31	31%	69%	52	37%	63%	41
Victoria/Tasmania	27%	73%	37	34%	66%	29	52%	48%	60	35%	65%	40
South Australia/NT	14%	86%	7	14%	86%	7	29%	71%	17	86%	14%	7
Western Australia	55%	45%	11	36%	64%	14	33%	67%	21	38%	63%	24
Australia	**32%**	**68%**	**109**	**38%**	**62%**	**103**	**38%**	**62%**	**177**	**40%**	**60%**	**141**
New Zealand	**19%**	**81%**	**21**	**45%**	**55%**	**22**	**39%**	**61%**	**31**	**40%**	**60%**	**25**

TIMING OF LIVING DONOR TRANSPLANTS

The timing of living donor transplants is shown in Figure 8.27.

The proportion of all primary living donor transplants performed "pre-emptively" in Australia was 37%, compared with 29% in 2008. This continues a broader trend of increasing use of pre-emptive transplantation (Figure 8.28). Thirty-three percent had received dialysis treatment for twelve months or longer prior to a first living donor graft.

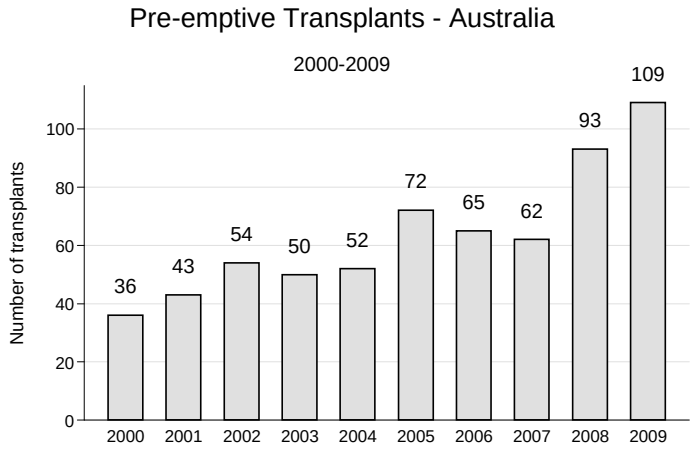
The proportion of pre-emptive primary living donor transplants in New Zealand was 31% in 2009, compared with 30% 2008 (Figure 8.28). Fifty-four percent received dialysis for twelve months or longer prior to being transplanted.

Figure 8.27

Timing of Live Donor Transplantation
for Primary Grafts in Relation to Date of Dialysis Start
by Year of Transplant 2005 - 2009

		2005	2006	2007	2008	2009
Aust	Pre-dialysis	72 (33%)	65 (27%)	62 (26%)	93 (29%)	109 (37%)
	< 1 month post dialysis	5 (2%)	7 (3%)	7 (3%)	5 (2%)	9 (3%)
	1-11.9 months post dialysis	59 (27%)	66 (27%)	55 (23%)	78 (25%)	81 (27%)
	≥ 12 months post dialysis	84 (38%)	105 (43%)	116 (48%)	141 (44%)	98 (33%)
NZ	Pre-dialysis	10 (22%)	9 (21%)	23 (43%)	20 (30%)	18 (31%)
	< 1 month post dialysis	1 (2%)	-	1 (2%)	2 (3%)	1 (2%)
	1-11.9 months post dialysis	13 (29%)	12 (28%)	9 (17%)	14 (21%)	8 (14%)
	≥ 12 months post dialysis	21 (47%)	22 (51%)	21 (39%)	30 (45%)	32 (54%)

Figure 8.28



FUNCTIONING TRANSPLANTS AT 31ST DECEMBER 2009

TRANSPLANT OPERATIONS 1963 - 2009

AUSTRALIA

There have been 18,817 transplant operations performed on 15,612 patients since 1963. Of these, 7,902 grafts were functioning at 31st December 2009 (362 per million population). Fourteen percent of operations and 12% of functioning grafts were regrafts. Living donor transplants accounted for 23% of operations and 37% of functioning grafts (Figure 8.29). The number of operations performed by each hospital during this period is shown in Appendix I, available on the Web.

The number of functioning grafts at the end of 2009 represents a 5% increase over the previous year. The annual rate of increase has remained steady (Figure 8.31 and 8.32). Eighty-eight percent of the functioning grafts were primary and 63% were from deceased donors. The number of functioning grafts from living donors increased by 8% from 2008 to 2009, a rate of increase that has been steady over several years.

The prevalence of functioning grafts in each State is shown in Figures 8.31 and 8.32. South Australia/Northern Territory has the highest prevalence of functioning renal transplants (522 per million). The lowest prevalence was in Queensland (330 per million). Patients with functioning grafts numbered in excess of those dialysis dependent in South Australia only (Appendix I).

Figure 8.29

Summary of Kidney Transplantation
Australia 1963 - 2009

		Performed	Functioning*
Deceased Donor	First	11,864	4,325
	Second	1,831	545
	Third	293	90
	Fourth	45	15
	Fifth	4	1
	Total	14,037	4,976
Living Donor	First	3,748	2,655
	Second	344	230
	Third	49	35
	Fourth	8	6
	Fifth	1	0
	Total	4,150	2,926
Total		**18,187**	**7,902**

* Lost to follow up not included

The age relationship of functioning transplants as a proportion of patients on renal replacement therapy is shown in Figure 8.37. The proportion depending on living donor grafts is greater in the younger age groups (Figures 8.34 and 8.35).

The modal age group for transplant dependent patients in 2009 was 55-64 years and the mean and median ages were 50.6 and 52 years respectively (Figures 8.36 and 8.37). The modal age group for living donor recipients was 45-54 years and 44% of recipients dependent on living donor grafts were less than 45 years of age.

The majority of recipients with functioning grafts were male (61%). The ethnic origin of recipients was Caucasoid 88%, Asian 8%, Aboriginal and Torres Strait Islanders 2% and Others 2% (Figure 8.39).

The 7,902 grafts functioning at the end of 2009 represent 43% of all kidneys transplanted since 1963. Thirty-three percent of grafts were functioning ten or more years and 9% for 20 or more years. There were 129 recipients with grafts functioning 30 years or longer (Figure 8.40). The longest graft had functioned for 41 years at 31st December, 2009.

NEW ZEALAND

There have been 3,515 operations performed on 2,967 patients since 1965 with 1,403 grafts (320 per million) still functioning at 31st December 2009 (Figure 8.30). Sixteen percent of operations and 10% of functioning grafts were regrafts. Kidneys from living donors accounted for 26% of operations and 42% of functioning grafts.

The number of operations performed by individual hospitals is shown in Appendix I at the end of this Report.

The age relationship and donor source are shown in Figure 8.36. The majority were male (57%) and the racial distribution was Caucasoid 78%, Maori 9%, Pacific People 6% and Asian 6% (Figure 8.39).

The majority (70%) of functioning grafts were in the 35-64 year age group and the mean and median ages were 49.9 and 51 years respectively. The modal age group was 55-64 years (Figure 8.36).

The 1,403 grafts functioning at the end of 2009 represent 40% of all kidneys transplanted since 1965. The longest surviving graft had functioned for 39 years at 31st December 2009. There have been 126 grafts functioning for 20 or more years and 16 for 30 or more years (Figure 8.41).

Figure 8.30

Summary of Kidney Transplantation
New Zealand 1965 - 2009

		Performed	Functioning*
Deceased Donor	First	2,129	715
	Second	390	81
	Third	74	17
	Fourth	7	0
	Total	**2,600**	**813**
Living Donor	First	838	543
	Second	71	43
	Third	6	4
	Total	**915**	**590**
Total		**3,515**	**1,403**

* Lost to follow up not included

Figure 8.31

Functioning Transplants 2000 - 2009
Transplanting Region, Australia and New Zealand
(Number Per Million Population)

Year	QLD	NSW/ACT *	VIC/Tas *	SA/NT *	WA	Australia	NZ
2000	1004 (282)	1790 (263)	1387 (266)	643 (378)	468 (250)	**5292 (276)**	**1023 (265)**
2001	1063 (293)	1823 (264)	1455 (276)	669 (391)	496 (261)	**5506 (284)**	**1063 (274)**
2002	1109 (299)	1905 (274)	1538 (289)	702 (409)	528 (274)	**5782 (294)**	**1116 (283)**
2003	1150 (303)	2006 (286)	1580 (293)	736 (426)	530 (271)	**6002 (302)**	**1168 (290)**
2004	1184 (305)	2104 (298)	1650 (302)	790 (456)	562 (284)	**6290 (313)**	**1221 (299)**
2005	1218 (307)	2175 (306)	1721 (312)	810 (464)	617 (307)	**6541 (322)**	**1239 (300)**
2006	1255 (307)	2268 (317)	1830 (326)	846 (476)	657 (319)	**6856 (331)**	**1247 (298)**
2007	1312 (314)	2312 (320)	1925 (338)	881 (490)	678 (322)	**7108 (338)**	**1284 (304)**
2008	1372 (321)	2418 (331)	2056 (355)	933 (512)	717 (331)	**7496 (351)**	**1350 (316)**
2009	1454 (330)	2529 (339)	2205 (372)	965 (522)	749 (335)	**7902 (361)**	**1403 (325)**

* For calculation of population related totals, the population of these States were combined
Patients lost to follow up are not included

Figure 8.32

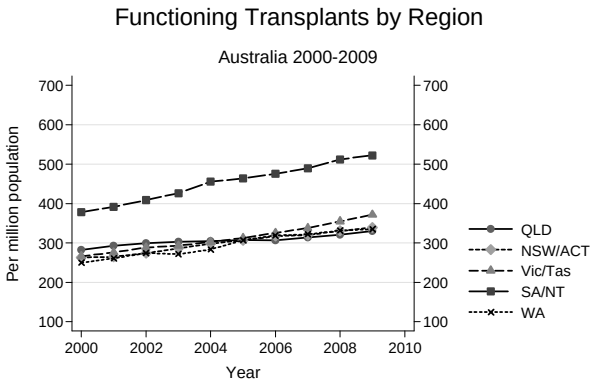


Figure 8.33

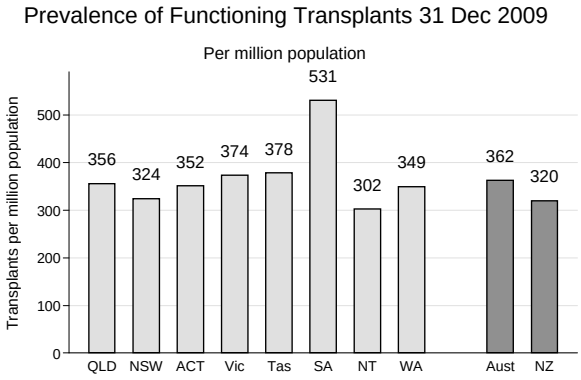


Figure 8.34

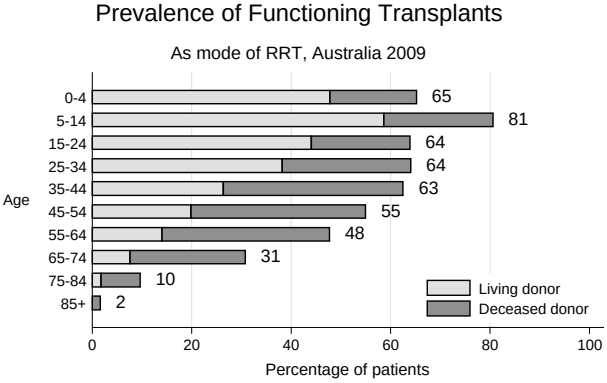


Figure 8.35

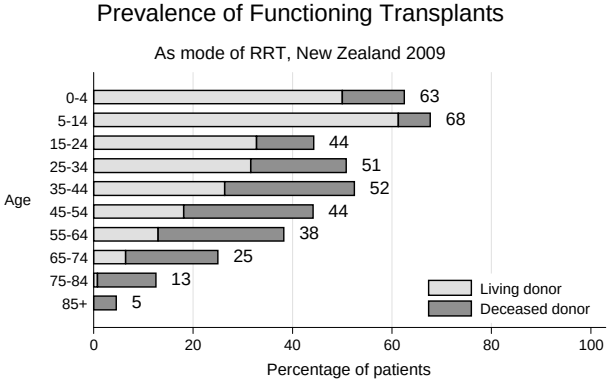


Figure 8.36

Age of All Functioning Transplant Patients
Resident Country at Transplant 31-Dec-2009

Donor Source	Graft No.	Age Groups										Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94	
Australia		**15**	**121**	**255**	**681**	**1424**	**1998**	**2041**	**1130**	**231**	**6**	**7,902**
Deceased Donor	1	3	30	68	224	681	1076	1274	788	176	5	4,325
	2	1	3	9	47	108	162	147	56	11	1	545
	3	-	-	2	4	29	31	17	7	-	-	90
	4	-	-	-	-	5	7	2	-	1	-	15
	5	-	-	-	-	-	1	-	-	-	-	1
	Total	**4**	**33**	**79**	**275**	**823**	**1277**	**1440**	**851**	**188**	**6**	**4,976**
Living Donor	1	11	85	165	368	524	643	549	269	41	-	2,655
	2	-	3	10	36	63	62	44	10	2	-	230
	3	-	-	1	1	12	14	7	-	-	-	35
	4	-	-	-	1	2	2	1	-	-	-	6
	Total	11	88	176	406	601	721	601	279	43	-	2,926
New Zealand		**5**	**21**	**54**	**127**	**243**	**366**	**380**	**175**	**31**	**1**	**1,403**
Deceased Donor	1	1	2	13	44	97	181	224	123	29	1	715
	2	-	-	1	4	18	30	23	5	-	-	81
	3	-	-	-	-	6	5	4	2	-	-	17
	Total	**1**	**2**	**14**	**48**	**121**	**216**	**251**	**130**	**29**	**1**	**813**
Living Donor	1	4	19	39	72	103	135	124	45	2	-	543
	2	-	-	1	7	18	12	5	-	-	-	43
	3	-	-	-	-	1	3	-	-	-	-	4
	Total	**4**	**19**	**40**	**79**	**122**	**150**	**129**	**45**	**2**	**-**	**590**

Figure 8.37

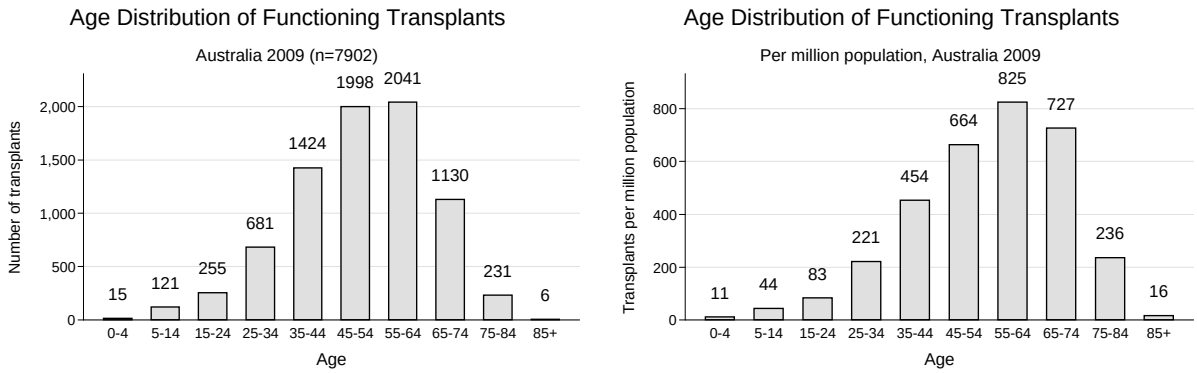


Figure 8.38

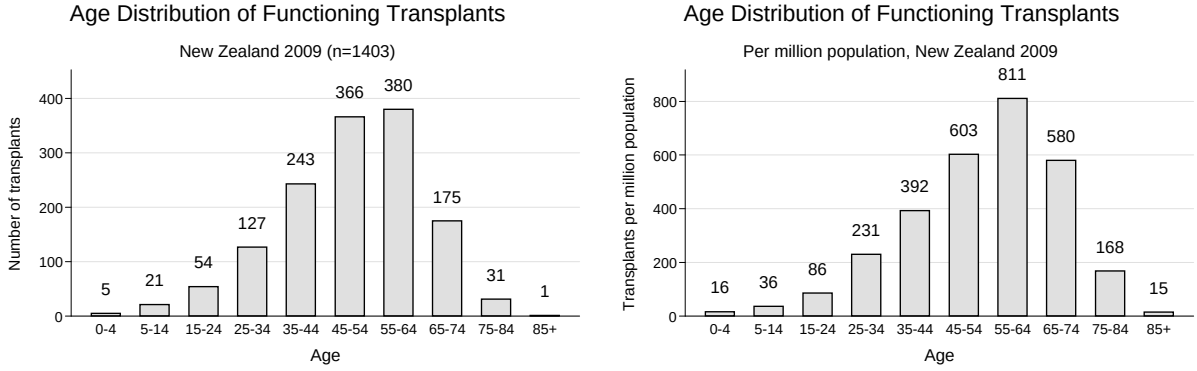


Figure 8.39

Functioning Transplant Patients - Resident Country at Transplant
Related to Ethnicity and Age Group 31-Dec-2009

Gender	Racial Origin	Prevalent Age Groups										Total
		00-04	05-14	15-24	25-34	35-44	45-54	55-64	65-74	75-84	85-94	
Australia		**15**	**121**	**255**	**681**	**1424**	**1998**	**2041**	**1130**	**231**	**6**	**7,902**
Female	Caucasoid	4	38	90	222	469	652	649	424	113	4	2,665
	Aboriginal/TSI	-	1	2	5	21	27	12	3	-	-	71
	Asian	-	7	6	21	46	97	83	24	5	-	289
	Other	-	4	4	13	17	19	17	8	1	-	83
	Total	**4**	**50**	**102**	**261**	**553**	**795**	**761**	**459**	**119**	**4**	**3,108**
Male	Caucasoid	9	64	131	365	784	1,064	1,130	618	106	2	4,273
	Aboriginal/TSI	-	3	3	7	15	28	24	9	-	-	89
	Asian	2	4	14	35	57	85	95	36	3	-	331
	Other	-	-	5	13	15	26	31	8	3	-	101
	Total	**11**	**71**	**153**	**420**	**871**	**1,203**	**1,280**	**671**	**112**	**2**	**4,794**
New Zealand		**5**	**21**	**54**	**127**	**243**	**366**	**380**	**175**	**31**	**1**	**1,403**
Female	Caucasoid	2	6	23	41	75	115	127	54	17	1	461
	Maori	1	2	4	7	12	14	9	7	2	-	58
	Pacific People	-	1	-	10	10	10	7	1	1	-	40
	Asian	-	1	-	4	6	16	11	1	-	-	39
	Total	**3**	**10**	**27**	**62**	**103**	**155**	**154**	**63**	**20**	**1**	**598**
Male	Caucasoid	1	10	20	50	118	168	174	80	10	-	631
	Maori	1	-	4	3	9	21	17	13	1	-	69
	Pacific People	-	1	1	6	6	7	17	9	-	-	47
	Asian	-	-	2	6	4	14	16	10	-	-	52
	Other	-	-	-	-	3	1	2	-	-	-	6
	Total	**2**	**11**	**27**	**65**	**140**	**211**	**226**	**112**	**11**	**-**	**805**

Figure 8.40

Number and Duration of Functioning Grafts

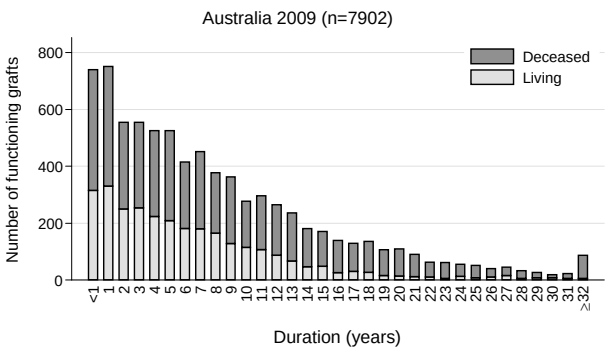
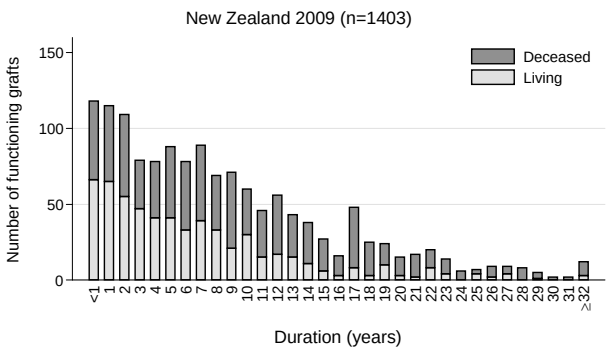


Figure 8.41

Number and Duration of Functioning Grafts



RATES OF GRAFT LOSS

The rates of graft failure and death in Australia in 2009 were 2.7% and 1.6% per patient year respectively; in total 4.4% of grafts at risk were lost. The rates of both graft failure and death with function decreased in 2009, from 2.9% and 2.1% respectively, in 2008 (Figure 8.42).

In 2009, the rates of graft failure in New Zealand increased from 2.1% to 2.3% and death with function increased from 1.8% to 2.3%; in total 4.6% of grafts at risk were lost. (Figure 8.42).

The causes of graft failure from 2000 to 2009 are shown in Figure 8.43.

Chronic allograft nephropathy and death with function remain the key impediments to long term graft survival.

The importance of death with function, chronic allograft nephropathy and other causes of graft loss after one year is evident in Figure 8.44.

Among the causes of death with functioning graft, cardiac disease and malignancy were predominant.

Figure 8.42

Graft Loss Rate 2000 - 2009

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Australia	**(5,622)**	**(5,834)**	**(6,111)**	**(6,325)**	**(6,652)**	**(6,913)**	**(7,182)**	**(7,471)**	**(7,921)**	**(8,268)**
Death with Function	3.0%	2.6%	2.3%	2.2%	2.1%	2.3%	2.0%	2.2%	2.1%	1.6%
Graft Failure	2.7%	2.8%	2.9%	2.7%	3.1%	2.8%	2.5%	2.5%	2.9%	2.7%
All Losses	5.7%	5.4%	5.2%	4.9%	5.3%	5.1%	4.4%	4.7%	5.1%	4.4%
New Zealand	**(1,089)**	**(1,133)**	**(1,180)**	**(1,227)**	**(1,273)**	**(1,314)**	**(1,329)**	**(1,370)**	**(1,406)**	**(1,471)**
Death with Function	2.6%	2.2%	2.7%	2.2%	2.2%	2.3%	2.6%	3.2%	1.8%	2.3%
Graft Failure	3.5%	3.8%	2.7%	2.5%	1.8%	3.3%	3.5%	2.9%	2.1%	2.3%
All Losses	6.1%	6.0%	5.4%	4.7%	4.0%	5.6%	6.0%	6.1%	3.9%	4.6%

Figure 8.43

Year of Graft Loss Due to Death or Failure 2000 - 2009

Loss	Cause of Failure	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Australia												
Death with Function		169	152	138	142	143	162	142	162	169	135	1,514
Failed	Rejection - Acute	9	7	8	3	5	3	7	11	10	17	80
	Rejection - Chronic Allograft (CAN)	91	111	108	113	143	134	105	131	172	147	1,255
	Rejection - Hyperacute	1	-	-	-	-	-	1	-	2	-	4
	Vascular	7	12	16	15	18	13	14	8	14	17	134
	Technical Problems	4	2	3	3	2	4	5	2	4	3	32
	Glomerulonephritis	15	8	15	12	13	16	23	15	9	15	141
	Non Compliance	7	7	11	10	8	6	3	8	6	12	78
	Other	18	15	16	13	19	15	19	14	16	14	159
Total		**321**	**314**	**315**	**311**	**351**	**353**	**319**	**351**	**402**	**360**	**3,397**
New Zealand												
Death with Function		28	25	32	27	28	30	34	44	26	34	308
Failed	Rejection - Acute	-	1	1	1	-	2	2	1	1	1	10
	Rejection - Chronic Allograft (CAN)	20	31	22	16	15	24	31	21	20	28	228
	Rejection - Hyperacute	-	-	-	-	1	-	-	-	-	-	1
	Vascular	8	1	1	1	-	4	-	3	1	2	21
	Technical Problems	-	2	1	2	-	2	3	1	-	-	11
	Glomerulonephritis	3	2	1	4	2	3	6	4	5	-	30
	Non Compliance	5	2	3	3	1	1	1	6	1	1	24
	Other	2	4	3	4	4	8	3	4	1	2	35
Total		**66**	**68**	**64**	**58**	**51**	**74**	**80**	**84**	**55**	**68**	**668**

Figure 8.44

Graft Losses 2005 - 2009

Cause of Loss	Australia			New Zealand		
	Graft Function			Graft Function		
	<1 year	>= 1 year	Any Time	<1 year	>= 1 year	Any Time
Death with functioning Graft						
Cardiac	24 (40%)	218 (31%)	242 (31%)	5 (42%)	49 (31%)	54 (32%)
Vascular	3 (5%)	75 (11%)	78 (10%)	1 (8%)	3 (2%)	4 (2%)
Infection	21 (35%)	99 (14%)	120 (16%)	2 (17%)	22 (14%)	24 (14%)
Social	1 (2%)	31 (4%)	32 (4%)	2 (17%)	3 (2%)	5 (3%)
Malignancy	7 (12%)	223 (31%)	230 (30%)	2 (17%)	69 (44%)	71 (42%)
Miscellaneous	4 (7%)	64 (9%)	68 (9%)	-	10 (6%)	10 (6%)
Total	**60 (100%)**	**710 (100%)**	**770 (100%)**	**12 (100%)**	**156 (100%)**	**168 (100%)**
Graft Failure						
Rejection - Acute	28 (19%)	20 (2%)	48 (5%)	2 (9%)	5 (3%)	7 (4%)
Rejection - Chronic Allograft (CAN)	9 (6%)	680 (78%)	689 (68%)	1 (5%)	123 (72%)	124 (64%)
Rejection - Hyperacute	3 (2%)	-	3 (<1%)	-	-	-
Vascular	52 (36%)	14 (2%)	66 (7%)	8 (36%)	2 (1%)	10 (5%)
Technical Problems	14 (10%)	4 (<1%)	18 (2%)	6 (27%)	-	6 (3%)
Glomerulonephritis	9 (6%)	69 (8%)	78 (8%)	1 (5%)	17 (10%)	18 (9%)
Non Compliance	1 (1%)	34 (4%)	35 (3%)	-	10 (6%)	10 (5%)
Other	29 (20%)	49 (6%)	78 (8%)	4 (18%)	14 (8%)	18 (9%)
Total	**145 (100%)**	**870 (100%)**	**1,015 (100%)**	**22 (100%)**	**171 (100%)**	**193 (100%)**

IMMUNOSUPPRESSION

AUSTRALIA

In Australia in 2009 Tacrolimus was used initially in 82% of patients and Cyclosporine in 16% of primary deceased donor grafts. The proportion of patients initially using Tacrolimus has increased since 2002, as shown in Figure 8.45. The number of patients still taking Prednisolone two years after transplantation has increased since 2002 and is now 94%, for patients transplanted in 2007.

Caution is necessary in the interpretation of small changes in clinical practice with immunosuppressive therapy. A number of large research trials are undertaken in Australia. The drug protocol used in those studies can potentially skew the number of patients taking specific drugs in any given year.

Figure 8.45 Australia

Immunosuppressive Therapy - Primary Deceased Donor Graft 2002 - 2009

	Year	Aza	CyA	Tacrol	MMF	MPA	Sirol	Everolimus	Pred	Number of Deceased Donor Grafts
Initial treatment	2002	9 (3%)	239 (73%)	80 (25%)	272 (83%)	15 (5%)	7 (2%)	23 (7%)	318 (98%)	326
	2003	8 (3%)	187 (68%)	77 (28%)	190 (69%)	52 (19%)	10 (4%)	0 (0%)	258 (94%)	274
	2004	6 (2%)	212 (59%)	136 (38%)	309 (85%)	25 (7%)	10 (3%)	1 (<1%)	360 (99%)	362
	2005	9 (3%)	131 (41%)	172 (54%)	299 (94%)	4 (1%)	17 (5%)	0 (0%)	308 (97%)	319
	2006	0 (0%)	155 (51%)	139 (45%)	260 (85%)	24 (8%)	3 (1%)	19 (6%)	296 (97%)	306
	2007	2 (1%)	139 (48%)	140 (49%)	244 (85%)	36 (13%)	0 (0%)	5 (2%)	285 (99%)	287
	2008	2 (1%)	137 (35%)	240 (61%)	364 (93%)	22 (6%)	0 (0%)	0 (0%)	389 (99%)	391
	2009	4 (1%)	62 (16%)	310 (82%)	356 (95%)	13 (3%)	0 (0%)	2 (1%)	374 (99%)	376
Treatment at 12 months	2002	24 (8%)	160 (52%)	124 (41%)	240 (79%)	11 (4%)	14 (5%)	19 (6%)	279 (91%)	305
	2003	22 (9%)	124 (50%)	104 (42%)	161 (64%)	45 (18%)	15 (6%)	0 (0%)	222 (89%)	250
	2004	23 (7%)	129 (39%)	162 (49%)	236 (72%)	46 (14%)	31 (9%)	1 (<1%)	304 (93%)	328
	2005	23 (8%)	84 (29%)	172 (59%)	229 (79%)	21 (7%)	29 (10%)	3 (1%)	262 (90%)	291
	2006	12 (4%)	94 (34%)	145 (52%)	216 (78%)	27 (10%)	21 (8%)	20 (7%)	259 (93%)	278
	2007	13 (5%)	87 (33%)	148 (56%)	189 (71%)	51 (19%)	12 (5%)	14 (5%)	252 (95%)	265
	2008	17 (5%)	83 (23%)	247 (69%)	283 (79%)	37 (10%)	11 (3%)	8 (2%)	341 (96%)	357
Treatment at 24 months	2002	22 (7%)	150 (51%)	119 (40%)	232 (79%)	14 (5%)	20 (7%)	19 (6%)	250 (85%)	295
	2003	19 (8%)	104 (43%)	103 (43%)	165 (69%)	40 (17%)	19 (8%)	0 (0%)	206 (86%)	240
	2004	30 (9%)	116 (36%)	154 (48%)	219 (68%)	45 (14%)	41 (13%)	5 (2%)	283 (88%)	320
	2005	23 (8%)	77 (27%)	156 (55%)	220 (78%)	23 (8%)	45 (16%)	5 (2%)	237 (84%)	282
	2006	15 (6%)	81 (30%)	144 (43%)	207 (76%)	31 (11%)	23 (8%)	25 (9%)	248 (92%)	271
	2007	12 (5%)	80 (31%)	151 (58%)	181 (70%)	54 (21%)	14 (5%)	13 (5%)	243 (94%)	259

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

IMMUNOSUPPRESSION

NEW ZEALAND

In New Zealand in 2009, 78% of new primary deceased donor transplant recipients received Cyclosporine and 20% received Tacrolimus (Figure 8.46). This constitutes a fall in the use of Tacrolimus compared with 2008. No transplant recipients commenced Azathioprine at the time of transplantation.

There are very few patients in New Zealand receiving TOR-inhibitors (Sirolimus or Everolimus). There has been a dramatic increase in the use of Mycophenolate preparations two years after transplantation. Whereas only 7% of the 2003 cohort remained on Mycophenolate two years post transplant, 82% of the 2007 cohort were still taking Mycophenolate preparations two years later.

Caution is necessary in the interpretation of differences in practice between Australia and New Zealand. The funding of different pharmaceutical agents is quite different in the two countries.

Figure 8.46 New Zealand

Immunosuppressive Therapy - Primary Deceased Donor Graft 2002 - 2009

	Year	Aza	CyA	Tacrol	MMF	MPA	Sirol	Everolimus	Pred	Number of Deceased Donor Grafts
Initial treatment	2002	0 (0%)	57 (97%)	2 (3%)	59 (100%)	0 (0%)	0 (0%)	0 (0%)	59 (100%)	59
	2003	0 (0%)	47 (87%)	7 (13%)	46 (85%)	3 (6%)	0 (0%)	0 (0%)	52 (96%)	54
	2004	0 (0%)	47 (94%)	3 (6%)	49 (98%)	0 (0%)	0 (0%)	0 (0%)	50 (100%)	50
	2005	0 (0%)	32 (76%)	8 (19%)	41 (98%)	0 (0%)	0 (0%)	0 (0%)	41 (98%)	42
	2006	0 (0%)	26 (68%)	11 (30%)	34 (92%)	0 (0%)	0 (0%)	3 (8%)	37 (100%)	37
	2007	0 (0%)	43 (74%)	15 (26%)	57 (98%)	0 (0%)	0 (0%)	1 (2%)	58 (100%)	58
	2008	0 (0%)	30 (67%)	15 (33%)	42 (93%)	3 (7%)	0 (0%)	0 (0%)	45 (100%)	45
	2009	0 (0%)	39 (78%)	10 (20%)	49 (98%)	0 (0%)	0 (0%)	0 (0%)	49 (98%))	50
Treatment at 12 months	2002	18 (33%)	41 (76%)	13 (24%)	31 (57%)	0 (0%)	0 (0%)	0 (0%)	53 (98%)	54
	2003	15 (33%)	24 (53%)	21 (47%)	22 (49%)	3 (7%)	1 (2%)	0 (0%)	42 (93%)	45
	2004	9 (19%)	30 (64%)	17 (36%)	37 (79%)	0 (0%)	0 (0%)	0 (0%)	45 (96%)	47
	2005	2 (5%)	21 (55%)	16 (42%)	33 (87%)	1 (3%)	2 (5%)	1 (3%)	35 (92%)	38
	2006	0 (0%)	18 (53%)	15 (45%)	29 (88%)	0 (0%)	0 (0%)	3 (9%)	32 (97%)	33
	2007	3 (6%)	31 (60%)	20 (38%)	43 (83%)	0 (0%)	2 (4%)	1 (2%)	48 (92%)	52
	2008	2 (5%)	21 (48%)	23 (52%)	39 (89%)	1 (2%)	0 (0%)	0 (0%)	41 (93%)	44
Treatment at 24 months	2002	49 (92%)	39 (74%)	14 (26%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	48 (91%)	53
	2003	34 (79%)	22 (51%)	21 (49%)	3 (7%)	2 (5%)	1 (2%)	0 (0%)	40 (93%)	43
	2004	12 (27%)	27 (60%)	18 (40%)	30 (67%)	0 (0%)	0 (0%)	0 (0%)	41 (91%)	45
	2005	2 (6%)	18 (50%)	17 (47%)	30 (83%)	1 (3%)	2 (6%)	1 (3%)	29 (81%)	36
	2006	0 (0%)	16 (50%)	16 (50%)	28 (88%)	0 (0%)	0 (0%)	2 (6%)	30 (94%)	32
	2007	3 (6%)	29 (58%)	20 (40%)	41 (82%)	0 (0%)	2 (4%)	1 (2%)	45 (90%)	50

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

USE OF ANTIBODY THERAPY FOR INDUCTION IMMUNOSUPPRESSION

AUSTRALIA AND NEW ZEALAND

The use of mono and polyclonal antibody agents for induction immunosuppression has changed through time and use and differs among centres and between Australia and New Zealand. The changes in use of these agents in recent years are reported here. Readers should note that differences between Australia and New Zealand are likely to reflect case mix and also drug availability. For this Report induction therapy is defined as treatment given pre-transplant or up to two weeks post transplant in the absence of rejection.

Figure 8.47 shows the use of induction agents over the last five years.

In Australia in 2009 10% of recipients received an alternative agent either in addition to, or instead of Basiliximab and Daclizumab. There has been a small recent increase in the use of Intravenous Immunoglobulin and Rituximab, and a larger increase in the use of T cell depleting polyclonal Ab, probably reflecting an increase in desensitisation regimens and ABO incompatible transplants. In addition to the agents listed in Figure 8.47, there were four Australian recipients who received Eculizumab for induction in 2009.

In New Zealand, agents other than the interleukin 2 receptor antagonists Basiliximab and Daclizumab are very uncommon. Since 2005 there has been a steady growth in induction immunosuppression using interleukin 2 receptor antagonists, although in 2009 the use of such agents fell from 61% to 52% of recipients.

Figure 8.47

Antibody Use for Induction Immunosuppression
Australia and New Zealand 2005 - 2009

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

	2005	2006	2007	2008	2009
Australia					
T cell depleting polyclonal Ab	24 (3.9)	30 (4.7)	17 (2.8)	22 (2.7)	40 (5.2)
Anti-CD25	365 (58.6)	507 (79.1)	532 (86.5)	739 (90.9)	711 (92.1)
Rituximab	-	7 (1.1)	7 (1.1)	21 (2.6)	14 (1.8)
Intravenous Immunoglobulin	1 (0.2)	9 (1.4)	14 (2.3)	25 (3.1)	23 (3.0)
Muromonab-CD3	3 (0.5)	-	2 (0.3)	-	1 (0.1)
Total New Transplants	**623**	**641**	**615**	**813**	**772**
New Zealand					
T cell depleting polyclonal Ab	-	-	-	-	-
Anti-CD25	7 (7.5)	18 (20.0)	47 (38.2)	74 (60.7)	63 (52.1)
Rituximab	-	-	-	1 (0.8)	2 (1.7)
Intravenous Immunoglobulin	-	-	-	-	-
Muromonab-CD3	1 (1.1)	-	-	-	-
Total New Transplants	**93**	**90**	**123**	**122**	**121**

USE OF ANTIBODY THERAPY FOR TREATMENT OF REJECTION

AUSTRALIA AND NEW ZEALAND

Figure 8.48 shows the number of people who received antibody agents for treating acute rejection by calendar year. The number is also reported as a proportion of new transplant recipients in each calendar year, but readers should be aware that although the large majority of people experiencing acute rejection do so within the first six months of transplantation, some experience rejection after this time (when they would not necessarily be counted as a new transplant). For this reason the total number of transplant recipients treated during the year is also reported.

Muromonab-CD3 use has not changed over recent years in New Zealand, and is used more there than in Australia. In Australia, use of Muromonab-CD3 has fallen, but use of Rituximab and, most dramatically, Intravenous Immunoglobulin has increased recently.

Figure 8.48

Antibody Use as Treatment for Acute Rejection
Australia and New Zealand 2005 - 2009

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

	2005	2006	2007	2008	2009
Australia					
T cell depleting polyclonal Ab	22 (3.5)	13 (2.0)	14 (2.3)	19 (2.3)	26 (3.4)
Anti-CD25	1 (0.2)	-	-	1 (0.1)	1 (0.1)
Rituximab	9 (1.4)	11 (1.7)	16 (2.6)	24 (3.0)	25 (3.2)
Intravenous Immunoglobulin	21 (3.4)	42 (6.6)	70 (11.4)	89 (10.9)	102 (13.2)
Muromonab-CD3	18 (2.9)	11 (1.7)	9 (1.5)	10 (1.2)	12 (1.6)
Total New Transplants	**623**	**641**	**615**	**813**	**772**
Total Transplants at Risk	**6,913**	**7,182**	**7,471**	**7,921**	**8,268**
New Zealand					
T cell depleting polyclonal Ab	2 (2.2)	-	2 (1.6)	3 (2.5)	3 (2.4)
Anti-CD25	1 (1.1)	1 (1.1)	1 (0.8)	1 (0.8)	-
Rituximab	-	-	-	-	3 (2.5)
Intravenous Immunoglobulin	-	3 (3.3)	3 (2.4)	2 (1.6)	7 (5.8)
Muromonab-CD3	8 (8.6)	10 (11.1)	10 (8.1)	10 (8.2)	8 (6.6)
Total New Transplants	**93**	**90**	**123**	**122**	**121**
Total Transplants at Risk	**1,314**	**1,329**	**1,370**	**1,406**	**1,471**

REJECTION RATES

AUSTRALIA AND NEW ZEALAND

Figure 4.89 shows the proportion of patients experiencing rejection in the first six months after transplant. For both living and deceased donor primary grafts, the six month incidence of rejection has fallen over the last decade.

Rejection rates in subsequent grafts are more variable due to the lower number of recipients, but do not appear to have fallen in either living or deceased donors.

Figure 8.49 Australia and New Zealand

Rejection Rates at Six Months Post Transplant

Donor Source	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Living Donor										
First graft	37.8%	26.1%	27.5%	27.7%	21.6%	19.6%	19.6%	21.1%	17.0%	15.2%
Second and subsequent grafts	47.4%	27.8%	13.0%	33.3%	34.8%	18.5%	33.3%	34.3%	30.0%	16.2%
Deceased Donor										
First graft	32.6%	25.1%	22.9%	26.8%	22.8%	18.6%	16.3%	17.7%	22.0%	19.5%
Second and subsequent grafts	37.3%	25.0%	24.1%	25.0%	27.5%	31.7%	36.4%	32.8%	30.3%	32.4%

SHORT TERM SURVIVAL - PRIMARY DECEASED DONOR GRAFTS

AUSTRALIA

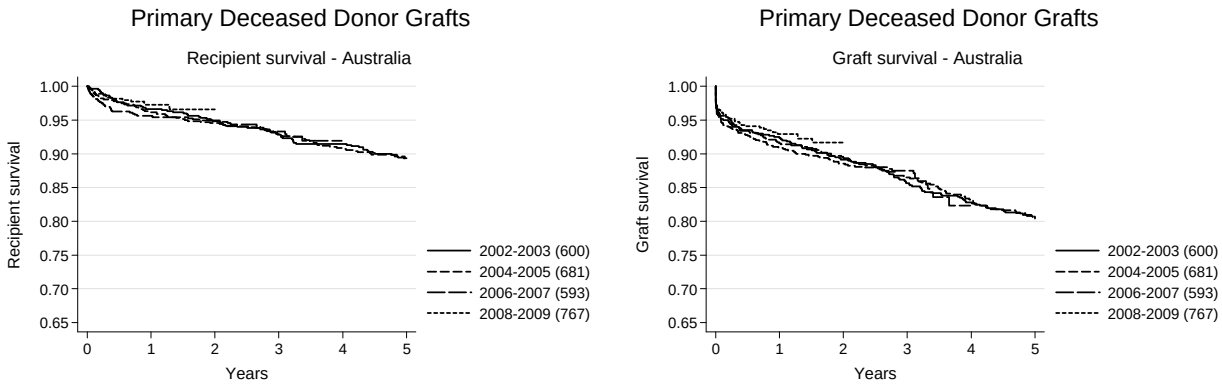
Graft and patient survival for primary deceased donor grafts performed in Australia, calculated by the Kaplan-Meier method, is shown in Figure 8.50. The figures include graft losses or deaths on the day of transplant, and graft survival is not censored for death. Unadjusted one year patient and graft survival for primary deceased donor grafts in Australia have stabilised in the past ten years. Kaplan-Meier graphs illustrating this are shown in Figure 8.51.

Figure 8.50

Primary Deceased Donor - Australia
Recipient and Graft Survival 1990 - 2009
% [95% Confidence Interval]

Year of Transplant	Survival			
	1 month	6 months	1 year	5 years
Recipient Survival				
1990-1991 (n=647)	99 [97, 99]	94 [92, 96]	93 [91, 95]	85 [82, 88]
1992-1993 (n=665)	99 [98, 99]	95 [94, 97]	94 [92, 96]	85 [82, 87]
1994-1995 (n=576)	99 [98,100]	96 [94, 97]	96 [94, 97]	86 [83, 88]
1996-1997 (n=624)	99 [97, 99]	96 [94, 97]	95 [93, 97]	86 [83, 89]
1998-1999 (n=541)	99 [98,100]	97 [95, 98]	95 [93, 96]	86 [83, 89]
2000-2001 (n=600)	99 [98,100]	97 [96, 98]	95 [93, 97]	89 [87, 92]
2002-2003 (n=600)	100 [99,100]	98 [96, 99]	97 [95, 98]	89 [87, 92]
2004-2005 (n=681)	99 [98,100]	98 [96, 99]	96 [94, 97]	89 [87, 92]
2006-2007 (n=593)	99 [97, 99]	96 [94, 98]	96 [94, 97]	-
2008-2009 (n=767)	99 [99,100]	98 [97, 99]	97 [96, 98]	-
Graft Survival				
1990-1991 (n=647)	92 [89, 94]	87 [84, 89]	85 [82, 87]	72 [68, 75]
1992-1993 (n=665)	91 [89, 93]	87 [85, 90]	86 [83, 88]	73 [69, 76]
1994-1995 (n=576)	95 [93, 97]	91 [89, 93]	90 [87, 92]	74 [70, 78]
1996-1997 (n=624)	94 [91, 95]	90 [87, 92]	89 [86, 91]	78 [74, 81]
1998-1999 (n=541)	96 [94, 97]	93 [90, 95]	91 [88, 93]	77 [73, 80]
2000-2001 (n=600)	97 [95, 98]	94 [92, 96]	92 [90, 94]	82 [79, 85]
2002-2003 (n=600)	95 [93, 97]	94 [91, 95]	93 [90, 94]	81 [77, 84]
2004-2005 (n=681)	95 [93, 97]	93 [91, 95]	91 [88, 93]	80 [77, 83]
2006-2007 (n=593)	96 [94, 97]	93 [91, 95]	92 [89, 94]	-
2008-2009 (n=767)	96 [95, 97]	94 [92, 96]	93 [91, 95]	-

Figure 8.51



SHORT TERM SURVIVAL - PRIMARY DECEASED DONOR GRAFTS

NEW ZEALAND

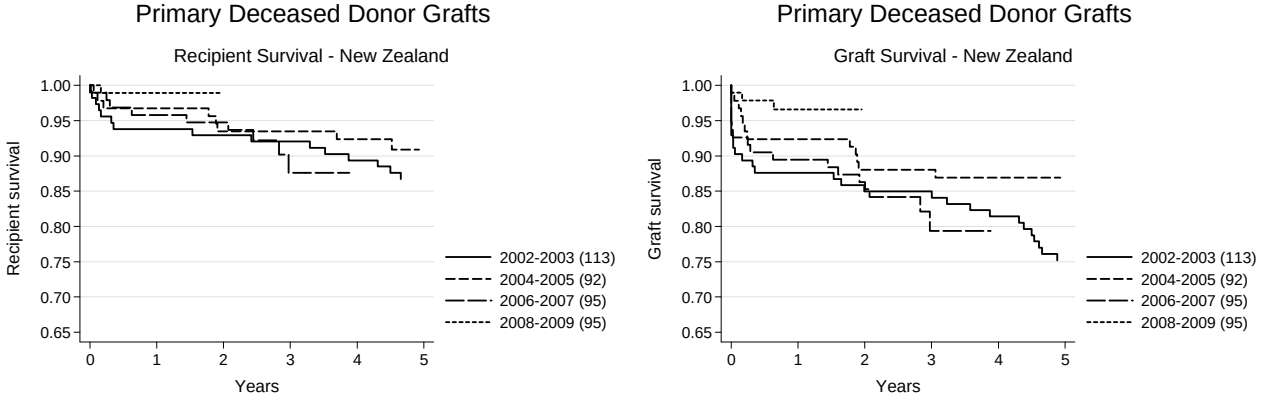
Graft and patient survival for primary deceased donor grafts performed in New Zealand, calculated by the Kaplan-Meier method, is shown in Figure 8.52. Like Australia, the improvement in unadjusted one year patient and graft survival have stabilised in the past ten years, although there is greater random variation due to smaller overall numbers. Figure 8.53 presents these data as Kaplan-Meier curves.

Figure 8.52

Primary Deceased Donor - New Zealand
Recipient and Graft Survival 1990 - 2009
% [95% Confidence Interval]

Year of Transplant	Survival			
	1 month	6 months	1 year	5 years
Recipient Survival				
1990-1991 (n=115)	97 [91, 99]	93 [87, 96]	92 [86, 96]	77 [69, 84]
1992-1993 (n=142)	98 [94, 99]	93 [87, 96]	89 [82, 93]	79 [71, 85]
1994-1995 (n=114)	97 [92, 99]	92 [85, 96]	91 [84, 95]	88 [80, 93]
1996-1997 (n=135)	99 [94,100]	95 [89, 97]	94 [89, 97]	84 [76, 89]
1998-1999 (n=126)	96 [91, 98]	91 [85, 95]	90 [83, 94]	79 [71, 85]
2000-2001 (n=125)	100 [-, -]	96 [91, 98]	96 [91, 98]	86 [79, 91]
2002-2003 (n=113)	98 [93,100]	94 [87, 97]	94 [87, 97]	87 [79, 92]
2004-2005 (n=92)	99 [93,100]	97 [90, 99]	97 [90, 99]	91 [83, 95]
2006-2007 (n=95)	99 [93,100]	97 [91, 99]	96 [89, 98]	-
2008-2009 (n=95)	100 [-, -]	99 [92,100]	99 92,100]	-
Graft Survival				
1990-1991 (n=115)	90 [83, 95]	84 [76, 90]	83 [74, 88]	63 [53, 71]
1992-1993 (n=142)	89 [82, 93]	82 [74, 87]	77 [70, 83]	67 [59, 74]
1994-1995 (n=114)	88 [80, 93]	84 [76, 90]	80 [71, 86]	69 [60, 77]
1996-1997 (n=135)	90 [83, 94]	87 [80, 91]	84 [77, 90]	72 [63, 79]
1998-1999 (n=126)	91 [85, 95]	86 [78, 91]	83 [75, 88]	69 [60, 76]
2000-2001 (n=125)	94 [89, 97]	90 [84, 94]	90 [84, 94]	78 [70, 85]
2002-2003 (n=113)	90 [83, 94]	88 [80, 92]	88 [80, 92]	75 [66, 82]
2004-2005 (n=92)	98 [92, 99]	92 [85, 96]	92 [85, 96]	87 [78, 92]
2006-2007 (n=95)	93 [85, 96]	91 [83, 95]	89 [81, 94]	-
2008-2009 (n=95)	99 [93,100]	98 [92, 99]	97 [90, 99]	-

Figure 8.53



LONG TERM SURVIVAL - PRIMARY DECEASED DONOR GRAFTS
AUSTRALIA AND NEW ZEALAND

The aim of this section is to summarise the longer term outcomes of kidney transplants in a survival metric rather than as rates - that is, to describe the proportion of grafts surviving at particular time points.

As can be seen from the tables and figures, the graft survival advantage of living over deceased donor recipients and first over subsequent grafts is consistent over time. The considerable jump in survival from the 1980-84 cohort to 1985-89 coincides with the introduction of Cyclosporin into routine clinical practice in Australia. Since that time there have been lesser but consistent improvements in graft survival.

Figure 8.54

Graft and Patient Survival of Primary Grafts
Deceased Donors - Australia and New Zealand

	Graft Survival					Patient Survival				
Time Period	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**
1970-1974 (n=1149)	58.2%	41.9%	30.3%	22.8%	14.6%	77.0%	57.4%	44.4%	34.2%	25.1%
1975-1979 (n=1463)	51.7%	36.0%	25.6%	17.7%	12.6%	81.0%	63.6%	49.4%	35.5%	26.2%
1980-1984 (n=1595)	63.3%	45.4%	32.1%	23.0%	16.2%	91.4%	75.1%	59.4%	45.9%	34.7%
1985-1989 (n=1916)	80.8%	65.8%	47.2%	32.9%	21.4%	92.1%	80.3%	64.5%	51.2%	39.6%
1990-1994 (n=1906)	85.0%	70.9%	50.7%	34.7%	-	93.4%	83.9%	67.8%	53.3%	-
1995-1999 (n=1779)	88.6%	76.2%	58.6%	-	-	94.7%	86.0%	72.5%	-	-
2000-2004 (n=1850)	91.6%	80.9%	-	-	-	96.0%	89.1%	-	-	-
2005-2009 (n=1911)	92.1%	-	-	-	-	96.5%	-	-	-	-

Figure 8.55

SHORT TERM SURVIVAL - SECOND AND SUBSEQUENT DECEASED DONOR GRAFTS

AUSTRALIA AND NEW ZEALAND

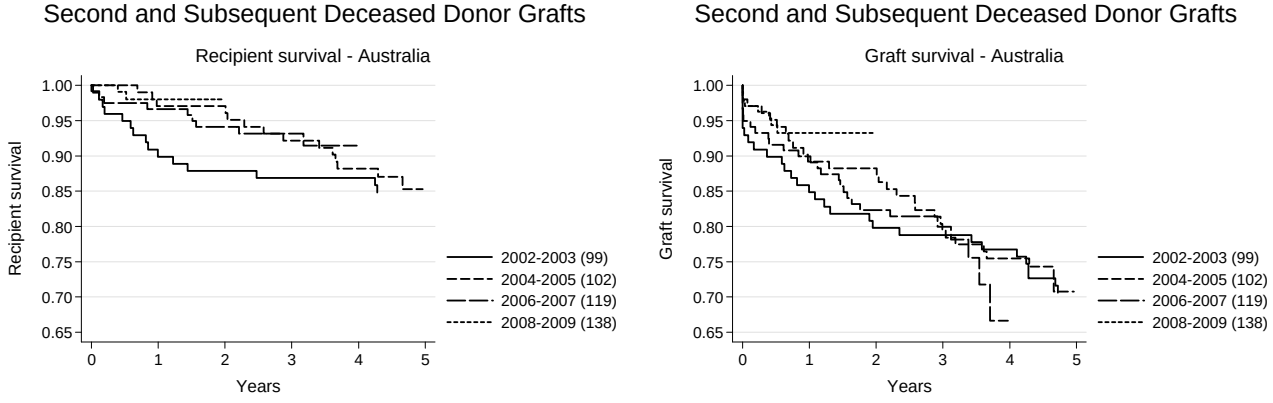
Patient and graft survival for second or subsequent deceased donor grafts in Australia, calculated by the Kaplan-Meier method, is shown in Figures 8.56 and 8.57.

Figure 8.56

Second and Subsequent Deceased Donor - Australia
Recipient and Graft Survival 1990 - 2009
% [95% Confidence Interval]

Year of Transplant	Survival			
	1 month	6 months	1 year	5 years
Recipient Survival				
1990-1991 (n=129)	98 [94,100]	95 [89, 97]	93 [87, 96]	84 [76, 89]
1992-1993 (n=135)	99 [95,100]	96 [91, 98]	95 [89, 97]	84 [76, 89]
1994-1995 (n=109)	98 [93,100]	97 [92, 99]	95 [89, 98]	87 [79, 92]
1996-1997 (n=94)	100 [-, -]	98 [92, 99]	98 [92, 99]	86 [77, 92]
1998-1999 (n=103)	100 [-, -]	97 [91, 99]	94 [87, 97]	84 [76, 90]
2000-2001 (n=78)	97 [90, 99]	95 [87, 98]	95 [87, 98]	90 [81, 95]
2002-2003 (n=99)	99 [93,100]	95 [88, 98]	90 [82, 94]	85 [76, 91]
2004-2005 (n=102)	100 [-,-]	100 [-,-]	97 [91, 99]	84 [76, 91]
2006-2007 (n=119)	99 [94,100]	97 [92, 99]	97 [91, 99]	-
2008-2009 (n=138)	100 [-,-]	99 [94,100]	98 [92, 99]	-
Graft Survival				
1990-1991 (n=129)	84 [77, 90]	81 [73, 86]	79 [71, 85]	63 [54, 70]
1992-1993 (n=135)	83 [75, 88]	79 [71, 85]	78 [70, 84]	65 [57, 73]
1994-1995 (n=109)	86 [78, 91]	83 [74, 89]	81 [72, 87]	67 [57, 75]
1996-1997 (n=94)	90 [82, 95]	87 [79, 93]	86 [77, 92]	69 [59, 77]
1998-1999 (n=103)	93 [86, 97]	88 [80, 93]	83 [75, 89]	68 [56, 76]
2000-2001 (n=78)	90 [81, 95]	83 [73, 90]	82 [72, 89]	67 [55, 76]
2002-2003 (n=99)	93 [86, 97]	90 [82, 94]	85 [76, 91]	71 [61, 79]
2004-2005 (n=102)	97 [91, 99]	95 [89, 98]	89 [81, 94]	71 [60, 79]
2006-2007 (n=119)	95 [89, 98]	92 [85, 95]	90 [83, 94]	-
2008-2009 (n=138)	97 [92, 99]	94 [88, 97]	93 [87, 97]	-

Figure 8.57



LONG TERM SURVIVAL - SECOND AND SUBSEQUENT DECEASED DONOR GRAFTS

AUSTRALIA AND NEW ZEALAND

The long-term graft and patient survival of second and subsequent grafts is shown in Figures 8.58 and 8.59. There has been a steady improvement in both graft and patient survival, such that survival of subsequent grafts is now similar to primary grafts (Figures 8.54-8.55).

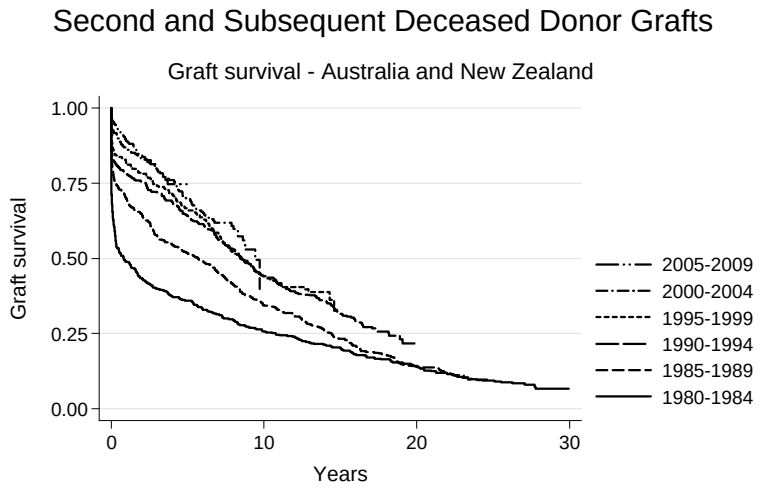
Figure 8.58

Graft and Patient Survival of Second and Subsequent Grafts
Deceased Donors
Australia and New Zealand

	Graft Survival					Patient Survival				
Time Period	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**
1970-1974 (n=158)	58.9%	37.3%	27.2%	21.5%	14.6%	79.1%	55.7%	42.4%	33.5%	26.6%
1975-1979 (n=284)	44.0%	28.2%	20.4%	15.0%	8.1%	78.2%	57.4%	44.7%	31.3%	20.0%
1980-1984 (n=417)	48.9%	36.0%	25.6%	20.3%	14.2%	90.6%	74.8%	59.0%	46.8%	37.1%
1985-1989 (n=458)	70.1%	51.7%	34.4%	23.2%	13.9%	93.7%	79.2%	62.8%	47.3%	35.1%
1990-1994 (n=374)	78.3%	64.2%	44.1%	31.5%	-	93.0%	82.6%	67.9%	54.2%	-
1995-1999 (n=297)	81.8%	66.3%	44.0%	-	-	96.0%	86.2%	73.4%	-	-
2000-2004 (n=268)	86.6%	70.1%	-	-	-	93.7%	86.2%	-	-	-
2005-2009 (n=343)	89.2%	-	-	-	-	96.0%	-	-	-	-

Note: These survival figures are calculated using the Kaplan-Meier method rather than actuarial methods or simply a proportion of transplants performed.

Figure 8.59



SHORT TERM SURVIVAL - PRIMARY LIVING DONOR GRAFTS

AUSTRALIA AND NEW ZEALAND

For primary living donor graft recipients, excellent patient and graft survival rates have been maintained despite the increased rates of living donor transplantation and corresponding increase in performing less ideal living donor transplants, particularly from older donors and unrelated donor transplants.

Current patient and graft survival for primary living donor recipients in Australia and New Zealand are similar.

Figure 8.60 Australia

Year of Transplant	Primary Living Donor Grafts 1990 - 2009 Recipient and Graft Survival % [95% Confidence Interval]			
	1 month	6 months	1 year	5 years
Recipient Survival				
1990-1991 (n=126)	99 [95,100]	96 [91, 98]	95 [90, 98]	81 [72, 87]
1992-1993 (n=124)	100 [- , -]	99 [94,100]	98 [94,100]	92 [85, 96]
1994-1995 (n=179)	100 [- , -]	98 [94, 99]	97 [93, 98]	94 [89, 97]
1996-1997 (n=239)	100 [- , -]	99 [97,100]	99 [96,100]	96 [92, 98]
1998-1999 (n=305)	100 [- , -]	99 [97,100]	99 [97,100]	96 [93, 97]
2000-2001 (n=364)	99 [98,100]	99 [97, 99]	99 [97, 99]	95 [92, 97]
2002-2003 (n=409)	100 [98,100]	99 [97, 99]	98 [96, 99]	93 [90, 95]
2004-2005 (n=441)	100 [98,100]	100 [98,100]	99 [98,100]	97 [95, 98]
2006-2007 (n=483)	100 [99,100]	99 [98,100]	99 [97, 99]	-
2008-2009 (n=614)	100 [98,100]	99 [97, 99]	99 [97, 99]	-
Graft Survival				
1990-1991 (n=126)	94 [89, 97]	90 [83, 94]	88 [81, 93]	74 [65, 81]
1992-1993 (n=124)	97 [92, 99]	96 [91, 98]	94 [88, 97]	83 [75, 88]
1994-1995 (n=179)	94 [90, 97]	92 [86, 95]	90 [85, 94]	83 [76, 87]
1996-1997 (n=239)	96 [92, 98]	95 [91, 97]	94 [90, 96]	87 [81, 90]
1998-1999 (n=305)	98 [96, 99]	97 [94, 98]	96 [94, 98]	87 [82, 90]
2000-2001 (n=364)	98 [95, 99]	96 [93, 97]	95 [93, 97]	88 [84, 91]
2002-2003 (n=409)	98 [96, 99]	96 [94, 98]	95 [93, 97]	88 [84, 91]
2004-2005 (n=441)	100 [98,100]	98 [96, 99]	98 [96, 99]	89 [86, 91]
2006-2007 (n=483)	99 [97, 99]	98 [96, 99]	97 [95, 98]	-
2008-2009 (n=614)	98 [96, 99]	96 [95, 98]	96 [94, 97]	-

Figure 8.61 New Zealand

Year of Transplant	Primary Living Donor Grafts 1990 - 2009 Recipient and Graft Survival % [95% Confidence Interval]			
	1 month	6 months	1 year	5 years
Recipient Survival				
1990-1991 (n=33)	100 [- , -]	100 [- , -]	100 [- , -]	97 [80,100]
1992-1993 (n=31)	100 [- , -]	97 [79,100]	97 [79,100]	94 [77, 98]
1994-1995 (n=40)	100 [- , -]	100 [- , -]	98 [84,100]	92 [78, 97]
1996-1997 (n=54)	100 [- , -]	100 [- , -]	100 [- , -]	87 [75, 94]
1998-1999 (n=66)	100 [- , -]	100 [- , -]	100 [- , -]	92 [83, 97]
2000-2001 (n=67)	100 [- , -]	100 [- , -]	100 [- , -]	95 [87, 99]
2002-2003 (n=84)	100 [- , -]	99 [92,100]	99 [92,100]	95 [88, 98]
2004-2005 (n=93)	99 [93,100]	98 [92, 99]	96 [89, 98]	89 [81, 94]
2006-2007 (n=97)	100 [- , -]	99 [93,100]	99 [93,100]	-
2008-2009 (n=125)	99 [94,100]	98 [94,100]	97 [91, 99]	-
Graft Survival				
1990-1991 (n=33)	97 [80,100]	97 [80,100]	94 [78, 98]	82 [64, 91]
1992-1993 (n=31)	100 [- , -]	97 [79,100]	97 [79,100]	84 [66, 93]
1994-1995 (n=40)	93 [79, 98]	90 [76, 96]	90 [76, 96]	75 [58, 86]
1996-1997 (n=54)	96 [86, 99]	96 [86, 99]	96 [86, 99]	74 [60, 84]
1998-1999 (n=66)	97 [88, 99]	95 [87, 99]	94 [85, 98]	74 [62, 83]
2000-2001 (n=67)	97 [89, 99]	97 [89, 99]	97 [89, 99]	83 [72, 90]
2002-2003 (n=84)	100 [- , -]	99 [92,100]	99 [92,100]	90 [82, 95]
2004-2005 (n=93)	96 [89, 98]	94 [86, 97]	92 [85, 96)	87 [78, 92]
2006-2007 (n=97)	100 [- , -]	98 [92, 99]	98 [92, 99]	-
2008-2009 (n=125)	98 [94,100]	98 [93, 99]	96 [90, 99]	-

Figure 8.62

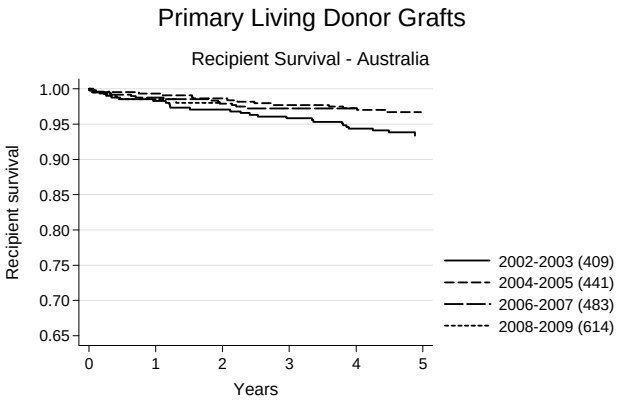


Figure 8.63

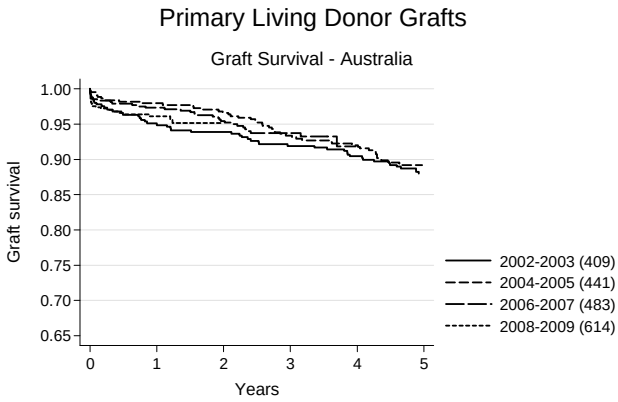


Figure 8.64

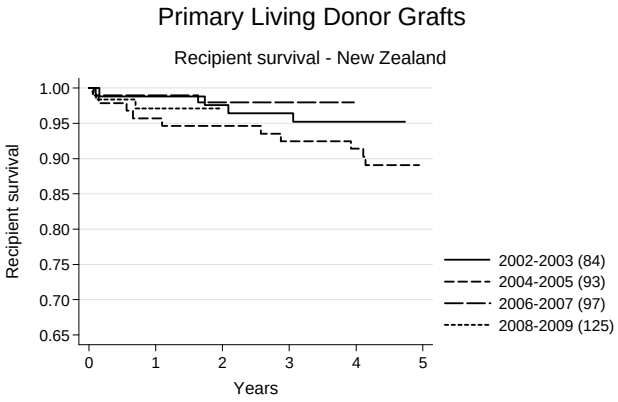
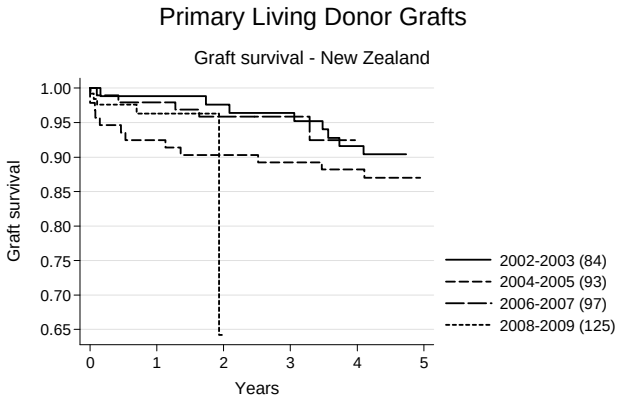


Figure 8.65



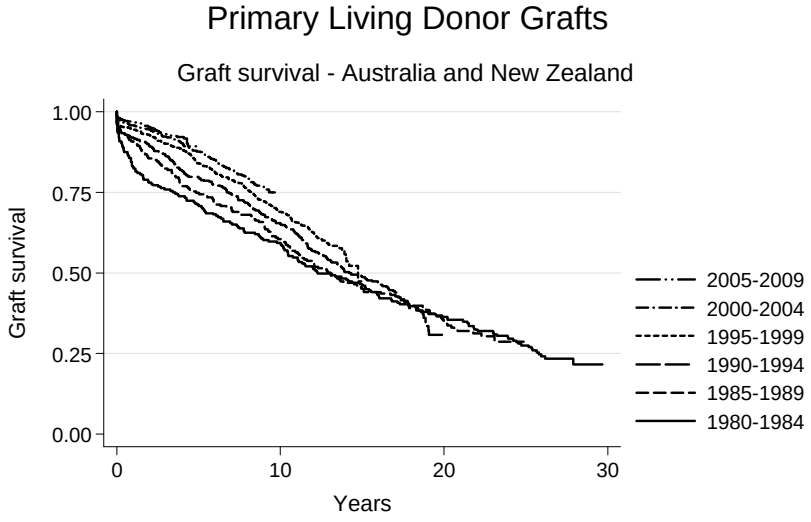
LONG TERM SURVIVAL - PRIMARY LIVING DONOR GRAFTS
AUSTRALIA AND NEW ZEALAND

Figure 8.66

Graft and Patient Survival of Primary Grafts
Living Donors - Australia and New Zealand

	Graft Survival					Patient Survival				
Time Period	1 year	5 yrs	10 yrs	15 yrs	20 yrs	1 year	5 yrs	10 yrs	15 yrs	20 yrs
1970-1974 (n=21)	85.7%	76.2%	61.5%	46.2%	20.5%	90.5%	81.0%	61.9%	52.4%	42.9%
1975-1979 (n=107)	81.2%	63.3%	49.%	41.2%	31.1%	90.7%	78.5%	71.0%	61.7%	52.2%
1980-1984 (n=241)	82.8%	71.2%	59.3%	46.5%	36.4%	96.3%	85.4%	74.9%	64.8%	55.8%
1985-1989 (n=230)	90.8%	74.8%	60.5%	45.1%	35.1%	95.2%	87.8%	79.9%	71.1%	62.9%
1990-1994 (n=431)	91.8%	79.6%	65.3%	48.8%	-	97.2%	89.2%	84.0%	74.4%	-
1995-1999 (n=766)	94.5%	84.1%	69.0%	-	-	98.6%	94.7%	86.6%	-	-
2000-2004 (n=1193)	95.9%	87.7%	-	-	-	98.5%	94.3%	-	-	-
2005-2009 (n=1584)	96.8%	-	-	-	-	98.6%	-	-	-	-

Figure 8.67



LONG TERM SURVIVAL - SECOND AND SUBSEQUENT LIVING DONOR GRAFTS

AUSTRALIA AND NEW ZEALAND

Figure 8.68

Graft and Patient Survival of Second and Subsequent Grafts
Living Donors - Australia and New Zealand

	Graft Survival					Patient Survival				
Time Period	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**	**1 year**	**5 yrs**	**10 yrs**	**15 yrs**	**20 yrs**
1970-1974 (n=1)	100.0%	100.0%	-	-		100.0%	100.0%	-	-	-
1975-1979 (n=11)	72.7%	45.4%	36.4%	36.4%	27.3%	100.0%	100.0%	81.8%	72.7%	63.6%
1980-1984 (n=42)	78.6%	64.3%	59.5%	50.0%	40.5%	97.6%	81.0%	78.6%	71.4%	51.9%
1985-1989 (n=31)	87.1%	74.2%	58.1%	45.2%	29.0%	96.8%	83.9%	71.0%	64.5%	47.5%
1990-1994 (n=38)	100.0%	86.8%	41.2%	35.7%	-	100.0%	94.7%	73.3%	67.9%	-
1995-1999 (n=73)	93.2%	83.6%	69.9%	-	-	98.6%	98.6%	89.0%	-	-
2000-2004 (n=107)	93.5%	85.9%	-	-	-	98.1%	95.3%	-	-	-
2005-2009 (n=175)	95.9%	-	-	-	-	98.8%	-	-	-	-

Figure 8.69

CHAPTER 9

ORGAN PROCUREMENT

(Data from the ANZOD Registry)

Leonie Excell
Kathy Hee
Graeme Russ

ORGAN DONORS IN AUSTRALIA AND NEW ZEALAND

(Summarised from the Australia and New Zealand Organ Donation Registry Report 2010)
For more detail please refer to Website: www.anzdata.org.au/anzod/anzodwelcome.htm.

Figure 9.1

Number of Donors** by Retrieval State (X) 2005 - 2009
( ) Donors Per Million

	2005	2006	2007	2008	2009
Queensland	35 (9)	36 (9)	39 (9)	48 (11)	47 (11)
New South Wales + *	54 (8+) (8*)	49 (7+) (7*)	53 (8+) (8*)	57 (8+) (8*)	68 (10+) (10*)
ACT + *	9 (17+) (28*)	4 (7+) (12*)	1 (2+) (3*)	5 (9+) (14.5*)	8 (14+) (23*)
Victoria	50 (10)	46 (x) (9)	55 (11)	67 (13)	65 (x) (12)
Tasmania	2 (4)	8 (16)	1 (2)	8 (16)	5 (10)
South Australia	20 (13)	36 (23)	27 (17)	43 (27)	33 (20)
Northern Territory	4 (20)	2 (10)	3 (14)	3 (14)	2 (9)
Western Australia	30 (15)	21 (10)	19 (9)	28 (13)	19 (8.5)
Australia	**204 (10)**	**202 (10)**	**198 (9)**	**259 (12)**	**247 (11)**
New Zealand	**29 (7)**	**25 (6)**	**38 (9)**	**31 (7)**	**43 (11)**

(x) Refers to donors retrieved by retrieval State (ie 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 2008 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 have been deemed medically unsuitable at the time of surgery or after removal of organs.

Donor figures for Australia for 2009 include six donors who went to the operating theatre but organs were not retrieved. Four donors had disease of organs, one donor a suspected malignancy and one a definite malignancy. Two were DCD donors. A further donor donated corneas only. Donor (dpmp) figures in Australia improved from 9-10 (dpmp) between 2005 and 2007 to 12 (dpmp) in 2008 and 11 (dpmp) in 2009.

New Zealand had one donor whose organs or tissues were not retrieved due to disease. A further donor donated corneas only.

In 2009 there was a range between the States of 8.5 donors per million population (dpmp) in Western Australia to 20 dpmp in South Australia. The ACT had 23 dpmp when the NSW Southern Area Health Service population was excluded.

Figure 9.2

Donors per Million Population and Donors per Thousand Deaths ( )
Australian States - Australia and New Zealand 2004 - 2008

Year	QLD	NSW *	ACT *	VIC	TAS	SA	NT	WA	AUST	NZ
2004	10 (1.6)	9 (1.4)	19 (4.2)	9 (1.4)	4 (0.5)	25 (3.4)	5 (1.1)	12 (2.1)	**11 (1.6)**	**10 (1.4)**
2005	9 (1.5)	8 (1.2)	28 (6.0)	10 (1.5)	4 (0.5)	13 (1.7)	20 (4.1)	15 (2.6)	**10 (1.6)**	**7 (1.1)**
2006	9 (1.5)	7 (1.1)	12 (2.7)	9 (1.3)	16 (2.0)	23 (3.0)	10 (2.1)	10 (1.8)	**10 (1.5)**	**9 (0.9)**
2007	9 (1.5)	8 (1.1)	3 (0.6)	11 (1.6)	2 (0.2)	17 (2.1)	14 (3.0)	9 (1.5)	**9 (1.4)**	**9 (1.3)**
2008	11 (1.7)	8 (1.2)	14.5 (3.0)	13 (1.9)	16 (1.9)	27 (3.4)	14 (2.9)	13 (2.2)	**12 (1.8)**	**7 (1.1)**

Figure 9.3

Donors per Thousand Deaths Aged < 75 years 2004 - 2008
( ) Is the % Deaths < 75 years as a Proportion of all Deaths *

Year	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
2004	4.0 (39%)	3.7 (35%)	10.1 (42%)	3.7 (34%)	1.4 (36%)	9.8 (34%)	1.4 (78%)	4.8 (40%)	**4.3 (37%)**	**3.4 (48%)**
2005	3.6 (39%)	3.2 (36%)	16.5 (36%)	4.4 (35%)	1.3 (37%)	4.8 (34%)	5.1 (78%)	6.3 (39%)	**4.1 (37%)**	**2.7 (40%)**
2006	3.8 (38%)	2.9 (34%)	7.0 (38%)	4.0 (33%)	5.6 (36%)	9.0 (32%)	2.8 (76%)	4.6 (39%)	**4.1 (36%)**	**2.3 (39%)**
2007	3.9 (38%)	3.0 (34%)	1.6 (40%)	4.9 (33%)	0.6 (35%)	5.9 (32%)	3.9 (77%)	3.9 (39%)	**4.0 (35%)**	**3.4 (38%)**
2008	4.7 (38%)	3.4 (33%)	8.1 (36%)	5.6 (33%)	5.5 (35%)	10.4 (31%)	3.9 (74%)	5.4 (38%)	**5.0 (34%)**	**2.9 (38%)**

* The number of actual donors is compared to the number of deaths that are aged less than 75 years (Figure 9.3)
Australian Bureau of Statistics - Deaths 3302.0 and Statistics NZ

DONOR PROFILE

AGE AND GENDER DISTRIBUTION

In Australia in 2009, 13% (31 donors) were 65 years or older and 2% (four donors) were aged 75 years or older. The oldest donor was 80.6 years and the youngest 6.6 months (0.5 years).

Donor gender in each State, Australia and New Zealand is shown in five year cohorts in Figure 9.4.

The mean age for donors in Australia in 2009, was 45.9 years, the highest since records began in 1989. The mean age in 1989 was 32.4 years and the age range was between 16.5 months and 69.5 years.

The mean age for Australian States in 2009 ranged from 31.5 years in Tasmania to 50.7 years in South Australia.

The median age for Australia in 2009 was 48.3 years, the highest since records began in 1989.

In Australian States the median age ranged from 40.7 years in Queensland to 54.7 years in Western Australia in 2009. If the smaller States and Territories are included, the range was 18.1 years in Tasmania to 44.6 years in the Northern Territory.

The mean and median age for donors from 1991 to 2009 for each State are shown in three year cohorts in Figures 9.5 and 9.6.

In New Zealand the mean age increased from 46.2 years in 2008 to 48.3 years in 2009. The median age also increased from 44.4 years to 46.9 years.

Three donors were over 65 years of age and none over 75 years. The age range was between 3.6 years and 74.6 years.

Figure 9.4

Donor Gender – States, Australia, New Zealand
1995 - 1999 2000 - 2004 2005 - 2009

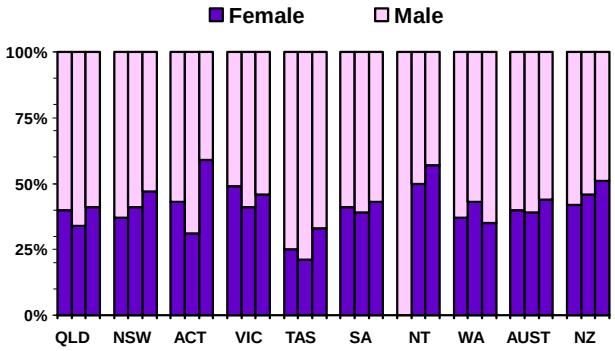


Figure 9.5

Australian States Mean Age of Donors

Years	QLD	NSW	ACT	VIC	TAS	SA	NT	WA
1989 - 1991	31.2	37.1	29.8	32.4	20.1	30.8	35.9	29.2
1992 - 1994	31.9	38.2	35.3	39.8	27.4	38.2	29.3	35.0
1995 - 1997	34.2	38.5	44.2	42.0	33.2	41.4	36.0	36.9
1998 - 2000	38.4	41.9	37.2	42.9	39.7	38.3	37.0	37.3
2001 - 2003	38.6	41.4	40.0	43.8	34.3	41.2	44.7	32.5
2004 - 2006	39.9	46.5	40.4	42.6	33.4	43.6	38.9	43.2
2007 - 2009	39.1	45.7	38.9	45.5	34.2	49.4	51.5	47.7

Figure 9.6

Australian States Median Age of Donors

Years	QLD	NSW	ACT	VIC	TAS	SA	NT	WA
1989 - 1991	31.5	38.9	30.4	28.4	17.3	28.9	31.8	28.8
1992 - 1994	31.7	40.1	27.2	40.7	25.1	38.6	27.9	33.6
1995 - 1997	37.5	38.4	45.9	45.5	33.9	45.4	35.5	39.4
1998 - 2000	40.3	43.6	37.2	46.4	42.6	42.4	32.8	44.7
2001 - 2003	40.5	42.9	37.9	48.8	21.4	44.7	47.6	31.8
2004 - 2006	42.2	48.3	45.8	46.9	34.0	47.2	42.4	44.6
2007 - 2009	40.8	48.2	40.6	47.4	30.7	51.5	60.0	52.9

CAUSE OF DEATH - ALL DONORS

The cause of death for all organ donors in Australia since 1989 and for New Zealand since 1995 is shown in Figure 9.7.

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 relatively steady.

In the period 2003-2009, CVA accounted for 52% of donor deaths and road trauma 15%.

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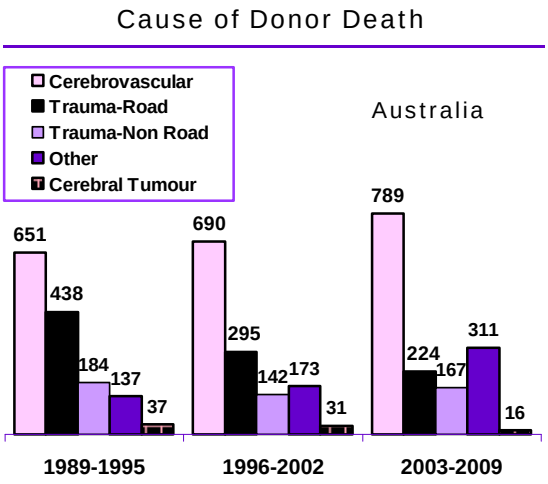
Figure 9.8 shows the cause of death by percentage in Australia and each Australian State from 2003 to 2009, and New Zealand from 2005 to 2009.

Figure 9.9 shows detailed cause of death by gender in Australia and New Zealand for 2009.

Figure 9.10 shows that CVA is the main cause of death in donors 55 years and older, 69% in Australia and 77% in New Zealand, whereas in the 15-34 year age group, trauma accounted for 45% of all deaths in Australia and 75% in New Zealand in 2009.

Figure 9.7



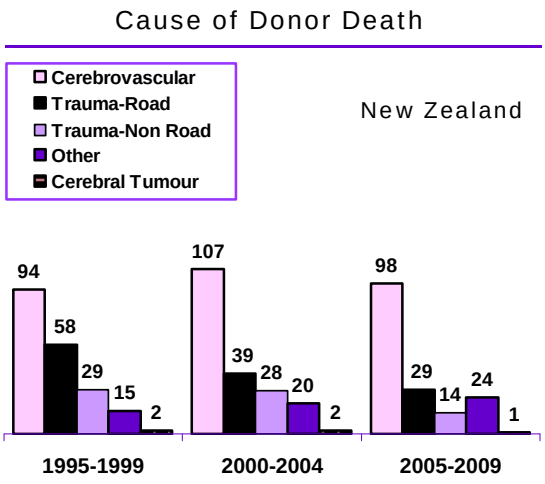


Figure 9.8

Cause of Donor Death 2003 - 2009

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ *
CVA	45%	55%	49%	57%	39%	52%	62.5%	51%	**52%**	**59%**
Trauma (road)	21%	15%	22%	10%	14%	10%	25%	20%	**15%**	**17%**
Trauma (non-road)	14%	8%	15%	9%	22%	10%	12.5%	16%	**11%**	**8%**
Hypoxia-Anoxia	17%	17%	12%	19%	25%	25%	0%	8%	**18%**	**10%**
Cerebral Tumour	1%	1%	0%	1%	0%	1%	0%	3%	**1%**	**1%**
Other	2%	4%	2%	4%	0%	2%	0%	2%	**3%**	**5%**

* NZ 2005 - 2009

Figure 9.9

Cause of Donor Death 2009

Causes of Death		Australia			New Zealand		
		Male	Female	Total	Male	Female	Total
CVA	Cerebral Infarct	8	7	**15**	0	0	**0**
	Intracranial Haemorrhage	23	24	**47**	6	5	**11**
	Subarachnoid Haemorrhage	27	29	**56**	2	8	**10**
Road Trauma	Cyclist	0	0	**0**	1	0	**1**
	Motor Bike Accident	6	1	**7**	0	0	**0**
	Motor Vehicle Accident	10	2	**12**	2	3	**5**
	Pedestrian	5	4	**9**	3	0	**3**
	Other Road Accident	3	0	**3**	0	0	**0**
Other Trauma	Fall	11	2	**13**	4	0	**4**
	Felony / Crime - Assault	6	1	**7**	0	0	**0**
	Gunshot	4	1	**5**	0	0	**0**
	Other Accident	3	0	**3**	0	0	**0**
Hypoxia Anoxia	Anaphylaxis	0	1	**1**	0	0	**0**
	Asthma	1	2	**3**	0	0	**0**
	Brain Injury	0	1	**1**	0	0	**0**
	Carbon Monoxide	1	1	**2**	1	0	**1**
	Cardiac Arrest	18	11	**29**	1	2	**3**
	Choking	0	1	**1**	0	0	**0**
	Drowning	0	1	**1**	1	0	**1**
	Encephalopathy	0	1	**1**	0	0	**0**
	Hanging	4	3	**7**	0	2	**2**
	Overdose	5	1	**6**	0	1	**1**
	Post Epilepsy Fit	1	0	**1**	0	0	**0**
	Strangulation	1	0	**1**	0	0	**0**
Cerebral Tumour	Low Grade Glioma (Benign)	1	0	**1**	0	0	**0**
	Meningioma (Benign)	0	1	**1**	0	0	**0**
	Oligoastrocytoma (Malignant)	0	1	**1**	0	0	**0**
Other	Cerebral Abscess	0	1	**1**	0	0	**0**
	Cerebral Oedema	1	1	**2**	0	0	**0**
	Influenza	0	1	**1**	0	0	**0**
	Meningitis (Neisseria)	0	0	**0**	0	1	**1**
	Meningitis (Pneumococcal)	1	1	**2**	0	0	**0**
	Meningitis (Strep Pneumoniae)	1	0	**1**	0	0	**0**
	Meningitis (Streptococcal)	1	0	**1**	0	0	**0**
	Pulmonary Embolism	0	1	**1**	0	0	**0**
	Raised Intercranial Pressure	0	1	**1**	0	0	**0**
	Respiratory Failure	2	1	**3**	0	0	**0**
Total		**144**	**103**	**247**	**21**	**22**	**43**

Figure 9.10

Cause of Donor Death Related to Age Group 2009

	Australia					New Zealand				
	Age Groups				Total	Age Groups				Total
	0-14	15-34	35-54	55 on		0-14	15-34	35-54	55 on	
CVA	1	11	46	60	**118 (48%)**	0	0	11	10	**21 (49%)**
Trauma (road)	3	18	4	6	**31 (13%)**	1	5	2	1	**9 (21%)**
Trauma (non-road)	0	11	9	8	**28 (11%)**	0	1	2	1	**4 (9%)**
Hypoxia-Anoxia	2	18	23	11	**54 (22%)**	2	1	4	1	**8 (19%)**
Cerebral Tumour	0	1	2	0	**3 (1%)**	0	0	0	0	**0 (0%)**
Other	0	6	5	2	**13 (5%)**	0	1	0	0	**1 (2%)**
Total	**6**	**65**	**89**	**87**	**247**	**3**	**8**	**19**	**13**	**43**

DONATION AFTER CARDIAC DEATH DONORS

Australia

The majority of organs are donated by heart-beating brain dead patients.

After a heart-beating donor is certified brain dead, they remain on the ventilator and the removal of organs may occur many hours later.

Donation after cardiac death (DCD) donors are defined as patients who are certified dead using the criterion of irreversible cessation of circulation.

As soon as cardiac death is confirmed the retrieval procedure is commenced in order to minimise warm ischaemic time.

Since 2005 there has been a steady increase in DCD donors each year, particularly in New South Wales, Victoria, Queensland and South Australia.

The total since 1989 is 131 donors for Australia and six donors for New Zealand, as shown in Figure 9.11.

The first multiorgan DCD was performed in South Australia in 2006.

In 2009 there were 42 DCD donors; 17 in Victoria, 15 in New South Wales, five in Queensland, three in South Australia and two in the Australian Capital Territory (ACT).

Mean age was 49.7 years and age range was 21 years to 70 years.

Causes of death in 2009 were hypoxia-anoxia (13), CVA (11), other trauma (8), road trauma (6), respiratory failure (3) and influenza (1).

Fifteen donors had two or more organs retrieved and transplanted, a further 22 donors had two kidneys transplanted, two donors had double lungs transplanted and one donor had a single kidney transplanted (two kidneys=one organ).

Only two of the 42 donors in 2009 did not have any organs transplanted or sent to the Tissue Bank due to disease of organs and malignancy found at retrieval.

The number and type of organs transplanted or sent to the Tissue Bank from 1989-2009 is shown for each State in Figure 9.12 and for Australia in Figure 9.13.

There were 14 intended DCD donors during 2009; nine did not proceed to cardiac standstill, two had consent withdrawn, two with positive serology and authority was not able to be obtained for one.

New Zealand

There were two DCD donors in New Zealand in 2009. Four kidneys and one liver were transplanted.

Figure 9.11

Donation after Cardiac Death Donors 1989 - 2009

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	Aust	NZ
1989	0	0	0	1	0	1	0	0	**2**	**-**
1990	0	2	0	0	0	1	0	0	**3**	**-**
1991	0	2	0	0	0	0	0	0	**2**	**-**
1992	0	1	0	0	0	0	0	0	**1**	**-**
1993	0	0	0	0	0	0	0	0	**0**	**0**
1994	0	0	0	0	0	1	0	0	**1**	**1**
1995	0	3	0	1	0	0	0	0	**4**	**0**
1996	1	1	0	0	0	0	0	0	**2**	**0**
1997	0	2	0	0	0	1	0	0	**3**	**1**
1998	0	0	0	0	0	2	0	0	**2**	**0**
1999	1	0	0	0	0	0	0	0	**1**	**0**
2000	0	0	0	0	0	0	1	0	**1**	**0**
2001	0	1	0	1	0	0	0	0	**2**	**0**
2002	0	0	0	0	0	1	1	0	**2**	**0**
2003	0	1	0	0	0	0	0	0	**1**	**0**
2004	0	2	0	0	0	0	0	1	**3**	**0**
2005	0	8	0	0	0	1	0	0	**9**	**0**
2006	0	4	0	1	0	3	0	0	**8**	**0**
2007	0	8	0	9	0	2	0	0	**19**	**0**
2008	5	10	2	3	0	3	0	0	**23**	**2**
2009	5	15	2	17	0	3	0	0	**42**	**2**
Total	**12**	**60**	**4**	**33**	**0**	**19**	**2**	**1**	**131**	**6**

Figure 9.12

Donation After Cardiac Death Donors 1989 - 2009
Organs Transplanted or Sent to Tissue Bank in Australia

Donor State	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	Total
Queensland																						
Kidneys	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	10	8	22
Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2
Cornea	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Bone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Heart Valves	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	3	2	7
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15**	**12**	**35**
New South Wales																						
Kidneys	0	4	3	2	0	0	5	2	4	0	0	0	0	0	2	4	16	8	13	18	27	108
Liver	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	4	7
Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	5	11
Cornea	0	2	0	0	0	0	0	2	0	0	0	0	2	0	0	4	10	2	8	8	4	42
Bone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Heart Valves	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	5	3	3	6	6	25
Total	**0**	**6**	**3**	**2**	**0**	**0**	**5**	**5**	**5**	**0**	**0**	**0**	**2**	**0**	**2**	**8**	**31**	**13**	**27**	**39**	**47**	**195**
ACT																						
Kidneys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	8
Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Cornea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Heart Valves	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2
Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**10**	**4**	**14**
Victoria																						
Kidneys	2	0	0	0	0	0	2	0	0	0	0	0	1	0	0	0	0	0	12	6	30	53
Liver	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	3
Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	1	7	14
(L) Lung	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
(R) Lung	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Pancreas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Cornea	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	10	4	20	40
Bone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	4
Heart Valves	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	4	1	2	8
Tissue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3
Total	**4**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**3**	**35**	**16**	**64**	**128**
South Australia																						
Kidneys	2	0	0	0	0	0	0	0	1	4	0	0	0	2	0	0	2	4	2	5	6	28
Liver	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
Cornea	2	2	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	4	16
Bone	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
Heart Valves	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	3
Total	**5**	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**3**	**4**	**0**	**0**	**0**	**4**	**0**	**0**	**2**	**9**	**5**	**5**	**11**	**54**
Northern Territory																						
Kidneys	0	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	**4**
Western Australia																						
Kidneys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	**2**
Australian Total	**9**	**9**	**3**	**2**	**0**	**3**	**7**	**10**	**8**	**4**	**3**	**2**	**6**	**6**	**2**	**10**	**33**	**25**	**67**	**85**	**138**	**432**

Figure 9.13

Donation after Cardiac Death Donors 1989 - 2009
Organs Transplanted or Sent to Tissue Bank in Australia

Organs	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	Total
Kidneys	4	4	3	2	0	0	7	4	5	4	2	2	1	4	2	6	18	12	27	43	75	225
Liver	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	4	4	12
Lungs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	8	7	14	31
(L) Lung	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
(R) Lung	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Pancreas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Cornea	4	4	0	0	0	2	0	4	2	0	0	0	4	2	0	4	10	6	18	14	28	102
Bone	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	4	3	11
Heart Valves	0	1	0	0	0	0	0	2	1	0	1	0	1	0	0	0	5	3	8	12	11	45
Tissue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	3
Total	**9**	**9**	**3**	**2**	**0**	**3**	**7**	**10**	**8**	**4**	**3**	**2**	**6**	**6**	**2**	**10**	**33**	**25**	**67**	**85**	**138**	**432**

ORGANS REQUESTED

The information relating to the request for organ donation refers only to those patients who become organ donors. If consent was sought and refused, the Registry has no record of these potential donors.

The difference between a request and a consent is a known objection by the donor or family refusal for the specific organ. Reasons for not requesting organs, not retrieving and not transplanting are documented for all of the specific organs.

For more detail please refer to Website: www.anzdata.org.au

The requests for specific organs in Australia in 2009 from 247 organ donors were: kidneys 97%, liver 95%, heart 81%, lungs 82% and pancreas 85%.

From the 43 New Zealand donors in 2009, the requests for specific organs were: kidneys 100%, liver 100%, heart 79%, lungs 86% and pancreas 60%.

MULTIPLE ORGAN RETRIEVAL

There were 43 (17%) of Australian donors in 2009 who donated solid organs, who had a single organ retrieved, shown in Figure 9.14. Kidney only donation occurred in 35 cases.

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

New Zealand had seven single organ donors in 2009, six donating kidneys and one donating a liver only.

In Australia 80% of donors and in New Zealand 79% of donors had two or more organs retrieved for the purpose of transplantation

Figure 9.14

Multiple Organ Retrieval 2004 - 2009

Number of Organs	Australia						New Zealand					
	2004	2005	2006	2007	2008	2009	2004	2005	2006	2007	2008	2009
Single	15%	17%	11%	15.5%	17%	17%	13%	14%	8%	16%	19%	16%
Two	27%	22%	23%	23%	23%	20%	43%	34%	24%	40%	23%	35%
Three	22%	17%	23%	23%	25%	27%	27%	21%	44%	26%	39%	33%
Four	23%	32%	23%	20%	20%	19%	10%	28%	12%	18%	16%	9%
Five	12%	10%	18%	15.5%	14%	14%	0%	3%	12%	0%	3%	2%
No organs	1%	2%	1%	3%	1%	3%	7%	0%	0%	0%	0%	5%

Figure 9.15

State by State Comparison of Multiple Organ Retrieval 2009

Number of Organs	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
Single	8 (17%)	13 (19%)	4 (50%)	8 (13%)	0 (0%)	6 (18%)	0 (0%)	4 (21%)	**43 (17%)**	**7 (16%)**
Two	14 (30%)	17 (25%)	1 (12.5%)	16 (25%)	0 (0%)	2 (6%)	0 (0%)	5 (26%)	**48 (20%)**	**15 (35%)**
Three	8 (17%)	15 (22%)	2 (25%)	15 (23%)	1 (20%)	12 (37%)	1 (50%)	6 (32%)	**67 (27%)**	**14 (33%)**
Four	13 (28%)	14 (20%)	1 (12.5%)	9 (14%)	1 (20%)	6 (18%)	1 (50%)	2 (10.5%)	**47 (19%)**	**4 (9%)**
Five	3 (6%)	6 (9%)	0 (0%)	14 (22%)	3 (60%)	7 (21%)	0 (0%)	2 (10.5%)	**35 (14%)**	**1 (2%)**
No organs	1 (2%)	4 (5%)	0 (0%)	2 (3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	**7 (3%)**	**2 (5%)**
Total	**47**	**69**	**8**	**64**	**5**	**33**	**2**	**19**	**247**	**43**

NB: 2 kidneys = 1 organ, 2 lungs = 1 organ
On occasions when only one kidney is retrieved, this is also defined as one organ

ORGAN RECIPIENTS TRANSPLANTED

Australia and New Zealand both had 3.4 organs per donor used for transplantation in 2009 (Figure 9.16).

The number of organs transplanted per donor each year for 1999-2009 in Australia and New Zealand is shown in Figure 9.17.

The number of recipients transplanted per donor in Australia in 2009 was 3.2 compared to 3.3 in 2008.

Tasmania had the highest number of organs transplanted; 5.6 per donor, followed by Queensland and Western Australia 3.6, South Australia and the Northern Territory 3.5, Victoria 3.4, New South Wales 3.3 and the ACT 2.6

These figures exclude tissue transplantation.

Figure 9.16

Organs Transplanted per Donor 2009

	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
No. Organs Transplanted	168	225	21	219	28	114	7	68	**850**	**116**
No. of Donors	47	69	8	64	5	33	2	19	**247**	**43**
Mean per Donor	**3.6**	**3.3**	**2.6**	**3.4**	**5.6**	**3.5**	**3.5**	**3.6**	**3.4**	**2.7**

Double Lungs = one organ
Kidney-Pancreas, Kidney-Heart, Kidney-Liver, Heart/Lungs = two organs

Figure 9.17

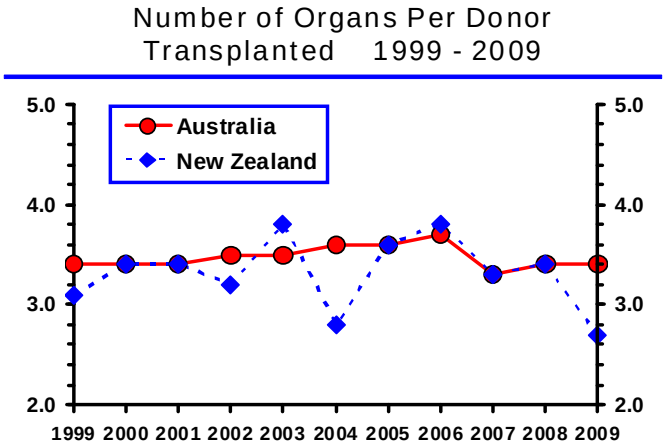


Figure 9.18

Organs Transplanted by Donor State in Australia and New Zealand 2009

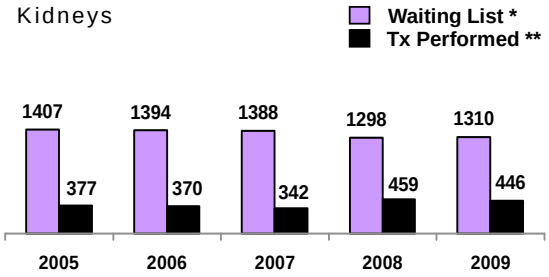
Organs Transplanted	QLD	NSW	ACT	VIC	TAS	SA	NT	WA	AUST	NZ
Kidney	87	120	13	119	10	56	4	37	**446**	**54**
Liver	29	40	4	35	3	27	2	15	**155**	**33**
Liver (Left)	6	6	0	1	2	1	0	0	**16**	**0**
Liver (Right)	5	6	0	1	1	1	0	0	**14**	**0**
Heart	15	12	1	14	3	9	0	5	**59**	**11**
Heart/Lungs	2	0	0	0	0	0	0	0	**2**	**0**
Lungs	18	32	2	30	3	11	1	4	**101**	**15**
Lung (Left)	1	0	0	2	1	0	0	2	**6**	**1**
Lung (Right)	2	0	0	2	1	0	0	0	**5**	**0**
Pancreas	3	8	1	11	4	5	0	5	**37**	**2**
Pancreas Islets	0	1	0	4	0	4	0	0	**9**	**0**
Total	**168**	**225**	**21**	**219**	**28**	**114**	**7**	**68**	**850**	**116**

KIDNEY DONATION

Figure 9.19 shows the number of Australian and New Zealand patients waiting for a kidney transplant and the number of deceased donor transplants performed for each year from 2005-2009.

Figure 9.19

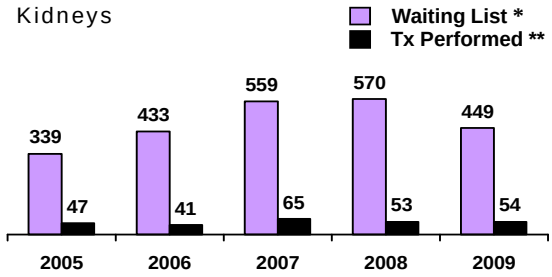
Waiting List vs Deceased Donor Transplants
Australia 2005 - 2009



* Source: NOMS (National Organ Matching System)

** Includes kidneys sent from New Zealand

Waiting List vs Deceased Donor Transplants
New Zealand 2005 - 2009



* Source of Waiting List – NZ Donor Coordinators

** Not included kidneys sent to Australia: 2004 (1) 2005 (4)

Figure 9.20

Outcome of Request for Kidney Donation 2009

Australia	New Zealand
Total Donors 247	**Total Donors 43**
No request for kidney donation 7	No request for kidney donation 0
Request for donation 240	**Request for donation 43**
No consent given 0	No consent given 0
Consent given 240 Donors	**Consent given 43 Donors**
Kidneys not retrieved 23	Kidneys not retrieved 13
Kidneys retrieved 457	**Kidneys retrieved 73**
Kidneys not transplanted 5	Kidneys not transplanted 17
Kidneys Transplanted 452	**Kidneys Transplanted 56**
(446 Recipients Transplanted)	**(54 Recipients Transplanted)**
Kidneys en bloc 2	Kidneys en bloc 2
Double adult 4	Double adult 0

Refer to Appendices for reasons kidneys were not requested, not retrieved and not transplanted

For more detail please refer to Website: www.anzdata.org.au/anzod/anzodwelcome.htm.

CHAPTER 10

CANCER REPORT

Angela Webster
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This year the cancer working group is presented in an alternative format. Instead of reiterating analyses undertaken in previous reports with the updated dataset, we have summarised all recent cancer reports, and provide a bibliography and summary of all known publications which have used ANZDATA cancer data as source data for their analyses. We hope this will allow the "mapping" of ANZDATA cancer research activity to date, which should meet two aims; firstly to provide an easy reference list for those wanting to find ANZDATA cancer work, and secondly to help us plan future ANZDATA cancer analyses more strategically by better showing what has already been done, and better revealing the gaps in our use of the data, and the questions yet to be tackled.

ANZDATA Cancer Reports From 2001 to Date

Listed here is the citation, summary and hyperlink to all ANZDATA cancer reports from 2001 to date

Year	Citation	Hyperlink to Report pdfs and any Related Slides	Principle Contents
2010	Webster AC, Wong G, Chapter 10, Cancer. ANZDATA Registry Report 2009. 33rd Annual Report. Adelaide, South Australia: Australia and New Zealand Dialysis and Transplant Registry 2011		Summary of ANZDATA Cancer Reports from 2001-To Date and bibliography and description of all known published papers using ANZDATA cancer data
2009	Webster AC, Wong G, McDonald SP. Chapter 10, Cancer. ANZDATA Registry Report 2009. 32nd Annual Report. Adelaide, South Australia: Australia and New Zealand Dialysis and Transplant Registry 2010	Chapter: http://www.anzdata.org.au/anzdata/AnzdataReport/32ndReport/Ch10.pdf Powerpoint: http://www.anzdata.org.au/anzdata/AnzdataReport/32ndReport/Ch10.zip	1) Site-specific cancer risk for people on dialysis and after kidney transplant. 2) Survival for people with a kidney transplant and breast or colorectal cancer. 3) Economic model of screening for renal cancer in the kidney transplant population.
2008	Webster AC, Wong G. Chapter 10, Cancer. ANZDATA Registry Report 2008. 31st Annual Report. Adelaide, South Australia: Australia and New Zealand Dialysis and Transplant Registry 2009. P 10.2-10.5	Chapter: http://www.anzdata.org.au/anzdata/AnzdataReport/31stReport/Ch10CancerReport.pdf Powerpoint: http://www.anzdata.org.au/anzdata/AnzdataReport/31stReport/Ch10.zip	1) Standardised mortality rates and mortality risk for people with cancer after transplantation 2) Economic evaluation of cervical cancer screening for women after transplantation
2007	Wong G, Webster AC Chapter 10, Cancer ANZDATA Registry Report 2007. 30th Annual report. Adelaide, South Australia: Australia and New Zealand Dialysis and Transplant Registry 2008. P 10.2-10.8	Chapter: http://www.anzdata.org.au/anzdata/AnzdataReport/30thReport/Ch10Cancer.pdf Powerpoint: http://www.anzdata.org.au/anzdata/AnzdataReport/30thReport/Ch10.zip	1) Cancer risk after transplantation by age for most common sites. Absolute cancer risk for different patient subgroups at 1, 5 and 10 years after transplant. 2) Economic evaluation of breast cancer screening for women on dialysis and for colorectal cancer screening after transplantation.

Year	Citation	Hyperlink to Report pdfs and any Related Slides	Principle Contents
2006	Wong G, Howard K, Craig JC, McDonald S, Chapman JR. Chapter 10, Cancer. ANZDATA Registry Report 2005. 28th Annual Report. Adelaide, South Australia: Australia and New Zealand Dialysis and Transplant Registry 2006. p. 131-9	Chapter: http://www.anzdata.org.au/anzdata/AnzdataReport/29thReport/Ch10Cancer.pdf Powerpoint http://www.anzdata.org.au/anzdata/AnzdataReport/29thReport/Ch10.zip	1) Standardised incidence ratios for Australian dialysis and transplant Patients by cancer site. 2) Economic evaluation of colorectal cancer screening in the kidney transplant population.
2005	Webster AC, Chapman JR. Chapter 10, Cancer. ANZDATA Registry Report 2005. 28th Annual Report. Adelaide, South Australia: Australia and New Zealand Dialysis and Transplant Registry 2006. p 99-103	Chapter: http://www.anzdata.org.au/anzdata/AnzdataReport/28thReport/Ch10Cancer.pdf Powerpoint: http://www.anzdata.org.au/anzdata/AnzdataReport/28thReport/Ch10.zip	Agreement of cancer records held by ANZDATA and by the New South Wales Cancer Registry
2004	Webster AC, Chapman JR. Chapter 10, Cancer. ANZDATA Registry Report 2004. 27th Annual Report. Adelaide, South Australia: Australia and New Zealand Dialysis and Transplant Registry 2005. p. 100-6.	Chapter: http://www.anzdata.org.au/anzdata/AnzdataReport/27thReport/files/Ch10Cancer.pdf Powerpoint: http://www.anzdata.org.au/anzdata/AnzdataReport/27thReport/files/Ch10.zip	Standardised incidence ratios for dialysis and transplant patients by cancer site, cumulative and absolute risk of cancer.
2003	**No Cancer Report**		
2002	Webster AC, Chapman JR. Chapter 10, Cancer. ANZDATA Registry 2002. 25th Annual Report. Adelaide, South Australia: Australia and New Zealand Dialysis and Transplant Registry 2003. p. 83-90.	Chapter: http://www.anzdata.org.au/anzdata/AnzdataReport/25thReport/files/Ch.10%20Cancer.zip Powerpoint: http://www.anzdata.org.au/anzdata/AnzdataReport/25thReport/files/10%20Cancer%20part%20a.zip and http://www.anzdata.org.au/anzdata/AnzdataReport/25thReport/files/10%20Cancer%20part%20b.zip	Risk of cancer on dialysis and after transplant, cumulative and site specific. Survival following diagnosis of cancer
2001	Sheil AGR. Chapter 10, ANZDATA Registry 2001. 24th Annual Report. Adelaide, South Australia: Australia and New Zealand Dialysis and Transplant Registry 2002, p83-90	Chapter: http://www.anzdata.org.au/anzdata/AnzdataReport/24thReport/files/Ch.09%20cancer.pdf Powerpoint: http://www.anzdata.org.au/anzdata/AnzdataReport/24thReport/files/pptCh09Cancer.zip	Risk of cancer after transplant, cumulative and site specific. Risk of cancer by immunosuppressive regimen

Bibliography of Publications Using ANZDATA Cancer Data

To summarise all publications known to have used ANZDATA cancer records, we undertook a literature search of MEDLINE and Pre-MEDLINE via the OvidSP platform on 6th December 2010 using the following search strategy:

1. anzdata.tw.
2. (australia$ adj10 transplant$).tw.
3. (australia$ adj10 dialysis).tw.
4. exp Neoplasms/
5. cancer.tw.
6. malignan$.tw
7. 4 or 5 or 6
8. 1 or 2 or 3
9. 7and 8

We examined the search results and the full text of publications if necessary, to find all original article publications in peer-reviewed journals arising from ANZDATA cancer data. We did not include conference abstracts, or papers where cancer was not the principal focus of the study.

The search gave 73 citations in MEDLINE, and 0 in Pre-MEDLINE. Of the 73 citations, 3 were duplicate records, and 49 were not relevant, leaving 21 citations which we included. To these 21 citations, we added a further 22 additional citations known to the authors of this report, but that had not be identified by the search strategy. A total of 43 articles are listed below, ordered by calendar year of publication, with a brief description of the methodology employed and the study rationale.

Readers should note this is not an exhaustive list, and there may be other related publications that have used ANZDATA cancer records that we were not able to locate with the above search, and were not known to us. We apologise if we have inadvertently left out any publications, and welcome being informed about them.

N	Year	Citation	Methodology	Rationale
1.	**2010**	Gallagher MP, Kelly PJ, Jardine M, Perkovic, Cass A, Craig JC, Eris J, Webster AC. Cancer after kidney transplantation: 20 year results of a randomised trial of maintenance azathioprine-prednisolone or cyclosporine. *Journal of the American Society of Nephrology*. 2010;21: 852-858	Cross synthesis design: RCT linked to ANZDATA to obtain long term outcomes	Skin cancer and cancer outcomes at 20 years post randomisation to 3 different immunosuppressive regimens
2.	**2010**	Vajdic CM, van Leeuwen MT, Turner JJ, McDonald AM, Webster AC, McDonald SP, Chapman JR, Kaldor JM, Grulich AE. No excess risk of follicular lymphoma in kidney transplant and HIV-related immune deficiency. *International Journal of Cancer.* 2010 *[in press doi 10.1002/ijc.25272]*	Cohort study: ANZDATA and Australian National HIV/AIDS Registries linked to Australian National Cancer Statistics Clearing House	Risk of Non Hodgkin Lymphoma subtypes compared for kidney transplant recipients and for those with HIV infection
3.	**2010**	Wong G, Howard K, Webster AC, Chapman JR, Craig JC. Screening for renal cancer in recipients of kidney transplants. *Nephroogyl Dialysis Transplanation*. 2010 Oct 20 doi: 10.1093/ndt/gfq627	Economic evaluation	Benefit, cost and harm of screening for renal cancer with ultrasound in native kidneys post kidney transplantation
4.	**2010**	Webster AC, Supramaniam R, Connell DL, Chapman JR, Craig JC. Validity of registry data: agreement between cancer records in an end stage kidney disease registry (voluntary reporting) and a cancer register (statutory reporting). *Nephrology* 2010;15:491-501	Cohort study: data linkage of NSW ANZDATA to NSW Cancer Registry	Agreement of cancer records from 2 registries, by cancer site, and by ESKD treatment modality
5.	**2010**	van Leeuwen MT, Webster AC, McCredie MRE, Stewart JH, McDonald SP, Amin J, Kaldor JM, Chapman JR, Vajdic CM, Grulich AE. Reduction of immunosuppression after kidney transplant failure is associated with decreased risk of some cancer types. *BMJ* 2010;340:c570	Cohort study: data linkage of Australian ANZDATA to Australian National Cancer Statistics Clearing House	Change in cancer incidence/ risk by site following graft failure and return to dialysis
6.	**2009**	Stewart JH, Vajdic CM, van Leeuwen MT, Amin J, Webster AC, Chapman JR, McDonald SP,Grulich AE, McCredie MRE. The pattern of excess cancer in dialysis and transplantation. *Nephrology Dialysis Transplantation* 2009; 24: 3225-3231	Cohort study with data linkage of Australian ANZDATA to Australian National Cancer Statistics Clearing House	Comparison of cancer incidence by site relative to the general population, for people with ESKD treated with either dialysis or transplantation

N	Year	Citation	Methodology	Rationale
7.	**2009**	Vajdic CM, van Leeuwen MT, Webster AC, McCredie MRE, Stewart JH, Chapman JR, Amin J, McDonald SP, Grulich AE. Grulich. Cutaneous Melanoma is Related to Immune Suppression in Kidney Transplant Recipients. *Cancer Epidemiology, Biomarkers and Prevention* 2009;18:2297-2303	Cohort study with data linkage of Australian ANZDATA to Australian National Cancer Statistics Clearing House	Melanoma incidence and risk factors in Australians with kidney transplants
8.	**2009**	van Leeuwen MT, Grulich AE, Webster AC, McCredie MRE, Stewart JH, McDonald SP, Amin J, Kaldor JM, Chapman JR, Vajdic CM. Immunosuppression and other risk factors for early and late non-Hodgkin lymphoma after kidney transplantation. *Blood* 2009; 114 (3):630-7	Cohort study with data linkage of Australian National Cancer Statistics Clearing House	Non Hodgkin Lymphoma incidence and risk factors in Australians with kidney transplants
9.	**2009**	van Leeuwen MT., Grulich AE., McDonald SP., McCredie MRE, Amin J, Stewart JH, Webster AC, Chapman JR, Vajdic CM. Immunosuppression and other risk factors for lip cancer after kidney transplantation. *Cancer Epidemiology, Biomarkers and Prevention* 2009; 18(2):561-569	Cohort study with data linkage of Australian National Cancer Statistics Clearing House	Lip cancer incidence and risk factors in Australians with kidney transplants
10.	**2009**	Wong G, Howard K, Webster AC, Chapman JR, Craig JC. The health and economic impact of cervical cancer screening and HPV vaccination in kidney transplant recipients. *Transplantation* 2009;87 (7):1078-91	Economic evaluation	Benefit, cost and harm of cervical cancer screening and HPV vaccination in women with kidney transplants.
11.	**2009**	Rey JW, Heister P, Wirges U, Nadalin S, Breuer R, Niehues T. Organ donor with unclear primary brain tumor, a contraindication for transplantation? Case report of a one year old child. *Klinische Padiatrie.* 2009;221(6):390-2.	Case report and literature review	Outcome of transplanted organs from donors with CNS malignancy, with review of registry cases
12.	**2008**	Wong G, Howard K, Chapman JR, Craig JC. Cost-effectiveness of breast cancer screening in women on dialysis. *American J ournal of Kidney Diseases*. 2008;52(5):916-29.	Economic evaluation	Benefit, cost and harm of breast cancer screening with mammography for women on dialysis.

N	Year	Citation	Methodology	Rationale
13.	**2008**	Wong G, Howard K, Craig JC, Chapman JR. Cost-effectiveness of colorectal cancer screening in renal transplant recipients. *Transplantation.* 2008, 27;85 (4):532-41.	Economic evaluation	Benefit, cost and harm of colorectal cancer screening using immunochemical faecal occult blood testing in kidney transplant recipients
14.	**2007**	Webster AC, Craig JC, Simpson JM, Jones MP, Chapman JR Identifying high risk groups and quantifying absolute risk of cancer after kidney transplantation: a cohort study of 15,183 recipients. *American Journal of Transplantation*. 2007;7 (9):2140-51	Cohort study with standardised comparison with Australian and New Zealand general population data	Cumulative, relative and absolute risk of cancer and most common cancers overall and for patient subgroups for Australian and New Zealander transplant recipients
15,	**2007**	Vajdic CM, McDonald SP, McCredie MRE, van Leeuwen MT, Stewart JH, Webster AC et al. Increased incidence of squamous cell carcinoma of the eye after kidney transplantation. *Journal of the National Cancer Institute*. 2007; 99(17):1340-2	Cohort study with data linkage of ANZDATA to Australian National Cancer Statistics Clearing House	Squamous cell cancer of the eye incidence and risk factors in Australians with kidney transplants
16.	**2006**	Vajdic CM, McDonald SP, McCredie MRE, van Leeuwen MT, Stewart JH, Webster AC et al. Cancer incidence before and after kidney transplantation. *JAMA* 2006; 296(23):2823-2831	Cohort study with data linkage of ANZDATA to Australian National Cancer Statistics Clearing House	Standardised risk of cancer by site for Australians on dialysis or with kidney transplants
17.	**2005**	Pond F, Serpell JW, Webster A. Thyroid cancer in the renal transplant population: epidemiological study. *Australia and New Zealand Journal of Surgery.* 2005; 75(3):106-109.	Cohort study	Epidemiology of thyroid cancer in ESKD
18.	**2005**	Faull RJ, Hollett P, McDonald SP. Lymphoproliferative disease after renal transplantation in Australia and New Zealand. *Transplantation.* 2005 Jul 27;80(2):193-7	Cohort study	Epidemiology of Post transplant lymphoproliferative disease

N	Year	Citation	Methodology	Rationale
19.	**2003**	Ramsay HM, Fryer AA, Hawley CM, Smith AG, Nicol DL, Harden PN. Factors associated with nonmelanoma skin cancer following renal transplantation in Queensland, Australia. *Journal of the American Academy of Dermatology.* 2003;49(3):397-406.	Single centre case series	Epidemiology of skin cancers in Queensland transplant recipients, using ANZDATA records for prior diagnoses
20.	**2003**	Stewart JH, Buccianti G, Agodoa L, Gellert R, McCredie MRE, Lowenfels AB, et al. Cancers of the kidney and urinary tract in patients on dialysis for end-stage renal disease: analysis of data from the United States, Europe, and Australia and New Zealand. *Journal of the American Society of Nephrology*. 2003;14(1):197-207	Cohort study using USRDS, EDTA and ANZDATA registry data with standardised comparison with general population	Standardised risk of cancers of the renal tract for people on dialysis overall, and for patient subgroups
21.	**2002**	Ramsay HM, Fryer AA, Hawley CM, Smith AG, Harden PN. Non-melanoma skin cancer risk in the Queensland renal transplant population*. British Journal of Dermatology*. 2002;147(5):950-6.	Single centre case series	Epidemiology of skin cancers in Queensland transplant recipients, compared with ANZDATA records for prior diagnoses
22.	**2001**	Chapman JR, Sheil AG, Disney AP. Recurrence of cancer after renal transplantation. *Transplantation Proceedings.* 2001;33(1-2):1830-1.	Cohort study	Cohort study
23.	**2001**	Hibberd AD, Trevillian PR, Wlodarzcyk JH, Gillies AH, Stein AM, Sheil AG, et al. Predialysis immunosuppression is an independent risk factor for some cancers in renal transplantation. *Transplantation Proceedings.* 2001;33(1-2):1846-7.	Cohort study	Risk of lymphoma and female genital tract cancer among those with exposure to immunosuppression prior to dialysis
24.	**1999**	Chui AK, Herbertt K, Wang LS, Kyd G, Hodgeman G, Verran DJ, et al. Risk of tumor transmission in transplantation from donors with primary brain tumors: an Australian and New Zealand Registry Report. *Transplantation Proceedings.* 1999;31(1-2):1266-7.	Cohort study using Australia and New Zealand Organ Donation Registry (ANZOD) linked to ANZDATA	Risk of tumour transmission from donors with primary brain tumours
25.	**1999**	Hibberd AD, Trevillian PR, Wlodarzcyk JH, Gillies AH, Stein AM, Sheil AG, et al. Cancer risk associated with ATG/OKT3 in renal transplantation. *Transplantation Proceedings.* 1999;31(1-2):1271-2	Cohort study	Risk of lymphoma and female genital tract cancer among those with exposure to ATG or OKT3 induction immunosuppression at ransplantation

N	Year	Citation	Methodology	Rationale
26.	**1999**	Maisonneuve P, Agodoa L, Gellert R, Stewart JH, Buccianti G, Lowenfels AB, et al. Cancer in patients on dialysis for end-stage renal disease: an international collaborative study. *Lancet*. 1999;10;354(9173):93-9.	Cohort study using USRDS, EDTA and ANZDATA registry data with standardised comparison with general population	Standardised risk of cancer by site, and for patient subgroups whilst on dialysis
27.	**1998**	Swindle P, Falk M, Rigby R, Petrie J, Hawley C, Nicol D. Transitional cell carcinoma in renal transplant recipients: the influence of compound analgesics. *British Journal of Urology*. 1998;81(2):229-33.	Single centre case series	Risk of post transplant ransitional cell carcinoma for recipients with analgesic nephropathy versus those with other primary renal disease
28.	**1997**	Bouwes Bavinck JN, Claas FH, Hardie DR, Green A, Vermeer BJ, Hardie IR. Relation between HLA antigens and skin cancer in renal transplant recipients in Queensland, Australia. *Journal of Investigative Dermatology.* 1997;108(5):708-11.	Single centre case series	Association of HLA antigens and post transplant skin cancer risk
29.	**1997**	Sheil AG, Disney AP, Mathew TH, Livingston BE, Keogh AM. Lymphoma incidence, cyclosporine, and the evolution and major impact of malignancy following organ transplantation. *Transplantation Proceedings.* 1997;29(1-2):825-7.	Cohort study of ANZDATA, Liver and heart transplant registries of Australia and New Zealand	Incidence rate of lymphoma and all-site cancer by organ transplanted
30.	**1996**	Bouwes Bavinck JN, Hardie DR, Green A, Cutmore S, MacNaught A, O'Sullivan B, et al. The risk of skin cancer in renal transplant recipients in Queensland, Australia. A follow-up study. *Transplantation*. 1996 15;61(5):715-21.	Single centre case series	Epidemiology of skin cancer in Queensland transplant recipients
31.	**1994**	Fairley CK, Sheil AG, McNeil JJ, Ugoni AM, Disney AP, Giles GG, et al. The risk of ano-genital malignancies in dialysis and transplant patients. *Clinical Nephrology.* 1994;41(2):101-5.	Cohort study with comparison to the Victorian general population	Risk of anogenital and breast cancers in dialysis and transplant population
32.	**1993**	Sheil AG, Disney AP, Mathew TH, Amiss N. De novo malignancy emerges as a major cause of morbidity and late failure in renal transplantation. *Transplantation Proceedings*. 1993;25(1 Pt 2):1383-4.	Cohort study with comparison to the South Australian general population	Risk of non-skin cancer for most frequent sites in transplant recipients

N	Year	Citation	Methodology	Rationale
33.	**1992**	LS Roeger, AGR Sheil, APS Disney, TH Mathew, N Amiss. Risk factors associated with the development of squamous cell carcinomas in immunosuppressed renal transplant recipients. *Clinical Transplantation* 1992 6:202-211	Cohort study	Risk factors for squamous cell skin cancer in transplant recipients
34.	**1992**	Sheil AG, Disney AP, Mathew TG, Amiss N, Excell L. Malignancy following renal transplantation. *Transplantation Proceedings.* 1992;24(5):1946-7.	Cohort study with comparison to the South Australian general population	Risk of non-skin cancer for most frequent sites in transplant recipients
35.	**1992**	Disney AP. Complications of immunosuppressive therapy in transplantation. 1: Neoplasia and infection. *Medical Journal of Australia*. 1992, 17;157(4):262-4.	Narrative review describing ANZDATA analyses	Relative risk of non-skin cancer for most frequent sites in cadaveric transplant recipients
36.	**1992**	Sheil AG. Development of malignancy following renal transplantation in Australia and New Zealand. *Transplantation Proceedings.* 1992;24(4):1275-9.	Cohort study	Relative risk of non-skin cancer in cadaveric transplant recipients
37.	**1991**	Sheil AG, Disney AP, Mathew TH, Amiss N, Excell L. Cancer development in cadaveric donor renal allograft recipients treated with azathioprine (AZA) or cyclosporine (CyA) or AZA/CyA. *Transplantation Proceedings*. 1991;23(1 Pt 2):1111-2.	Cohort study	Incidence of cancer after transplantation
38.	**1990**	McCredie M, Coates MS, Ford JM, Disney APS, Auld JJ, Stewart JH. Geographical distribution of cancers of the kidney and urinary tract and analgaesic nephropathy in Australia and New Zealand. *Australian and New Zealand Journal of Medicine,* 1990; 20: 684-688 and 694	Cohort study using ANZDATA compared with NSW, ACT, Queensland, Victoria, Tasmania and New Zealand cancer registry data	Standardised incidence rates of renal tract cancer over time

N	Year	Citation	Methodology	Rationale
39.	**1989**	McCredie M, Stewart JH, Mathew TH, Disney AP, Ford JM. The effect of withdrawal of phenacetin-containing analgesics on the incidence of kidney and urothelial cancer and renal failure. *Clinical Nephrology.* 1989;31(1):35-9.	Cohort study of NSW and ACT ANZDATA, compared with NSW and ACT cancer registry data	Standardised incidence rates of renal tract cancer over time
40.	**1987**	Sheil AG, Flavel S, Disney AP, Mathew TH, Hall BM. Cancer incidence in renal transplant patients treated with azathioprine or cyclosporine. *Transplantation Proceedings*. 1987;19(1 Pt 3):2214-6.	Cohort Study	Relative risk of skin and non-skin cancer in cadaveric transplant recipients
41.	**1986**	Sheil AG. Cancer after transplantation. *World Journal of Surgery*. 1986;10(3):389-96.	Narrative review describing ANZDATA analyses	Cumulative risk and site specific risk of cancer after transplantation
42.	**1985**	Sheil AG, Flavel S, Disney AP, Mathew TH. Cancer development in patients progressing to dialysis and renal transplantation. *Transplantation Proceedings*. 1985;17(2):1685-8.	Cohort study	Incidence, cumulative incidence and outcome of skin and non-skin cancer
43.	**1977**	Sheil AG. Cancer in renal allograft recipients in Australia and New Zealand. *Transplantation Proceedings*. 1977;9(1):1133-6.	Cohort study	Incidence and outcome of cancer after transplantation

CHAPTER 11

PAEDIATRIC REPORT

Steven McTaggart
Hannah Dent
Sean Kennedy
Lilian Johnstone
Stephen McDonald

This year, as well as providing a summary of current trends in the frequency and causes of ESKD, the paediatric report will focus on current trends in the epidemiology and outcomes of paediatric transplantation.

INCIDENCE AND PREVALENCE OF ESKD IN CHILDREN AND ADOLESCENTS 1991 - 2009

GENERAL OVERVIEW

As shown in Figure 11.1, the incidence of children and adolescents developing ESKD and being treated with renal replacement therapy has remained relatively stable over the past 20 years, although as numbers are small, there are fluctuations from year to year.

Prevalent numbers of treated ESKD have also remained mostly stable over the past ten years, although there appears to be a trend to increasing prevalence in the 10-14 year age group in Australia and the 15-19 year age group in New Zealand (Figure 11.2).

Figure 11.1

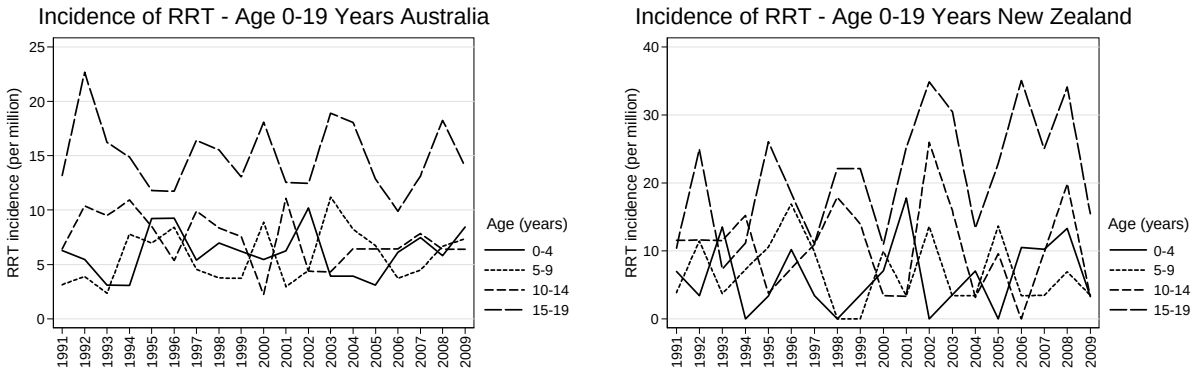
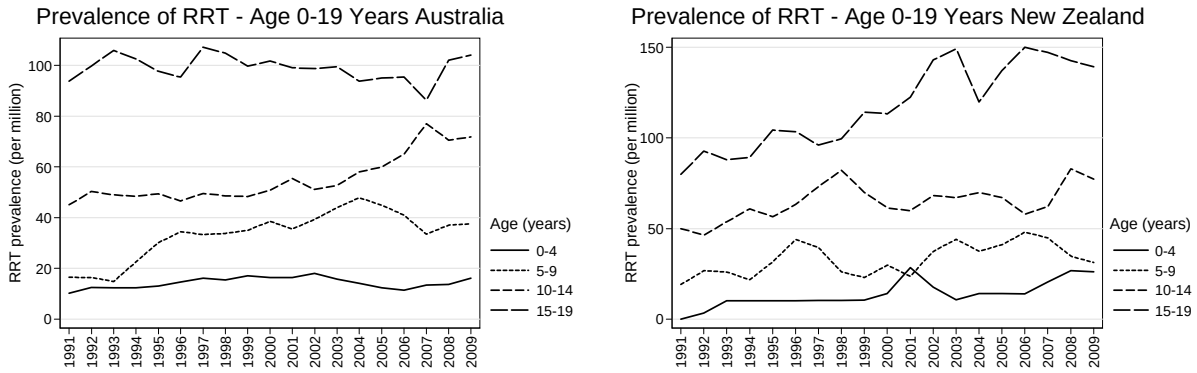


Figure 11.2



CAUSES OF ESKD IN CHILDREN AND ADOLESCENTS 2004 - 2009

Overall, glomerulonephritis remains the most common cause of ESKD in children and adolescents (32%) but causes vary significantly with age. In young children renal hypoplasia/dysplasia is the most common cause while glomerulonephritis is more common in older children and adolescents.

Figure 11.3

Causes of End Stage Kidney Disease
In Children and Adolescents 2004 - 2009

Primary Renal Disease	Age Groups (Years)				Total
	0-4	5-9	10-14	15-19	
Glomerulonephritis	12 (20%)	12 (20%)	23 (33%)	69 (41%)	116 (32%)
Familial Glomerulonephritis	-	-	1 (1%)	7 (4%)	8 (2%)
Reflux Nephropathy	2 (3%)	2 (3%)	6 (9%)	30 (18%)	40 (11%)
Polycystic Kidney Disease	5 (8%)	3 (5%)	2 (3%)	-	10 (3%)
Medullary Cystic Disease	-	1 (2%)	1 (1%)	10 (6%)	12 (3%)
Posterior Urethral Valve	9 (15%)	6 (10%)	7 (10%)	4 (2%)	26 (7%)
Haemolytic Uraemic Syndrome	7 (12%)	2 (3%)	2 (3%)	3 (2%)	14 (4%)
Hypoplasia / Dysplasia	15 (25%)	17 (28%)	11 (16%)	14 (8%)	57 (16%)
Cortical Necrosis	1 (2%)	2 (3%)	1 (1%)	5 (3%)	9 (3%)
Interstitial Nephritis	-	1 (2%)	-	2 (1%)	3 (1%)
Cystinosis	-	2 (3%)	1 (1%)	-	3 (1%)
Uncertain	1 (2%)	1 (2%)	2 (3%)	9 (5%)	13 (4%)
Miscellaneous / Other	8 (13%)	11 (18%)	13 (19%)	17 (10%)	49 (14%)
Total	**60**	**60**	**70**	**170**	**360**

MODALITY OF TREATMENT 2004 - 2009

The modality of the first renal replacement treatment is shown in Figure 11.4. Although numbers are small and therefore fluctuate from year to year, around 16% of children and adolescents receive pre-emptive kidney transplants. Of the remainder, 45% commence renal replacement therapy with haemodialysis compared with 39% starting with peritoneal dialysis.

Figure 11.4

Modality of Initial Renal Replacement Therapy By Year of First Treatment - Australia and New Zealand

Current Treatment	Year						
	2004	2005	2006	2007	2008	2009	Total
Haemodialysis	31 (53%)	23 (43%)	23 (45%)	26 (43%)	35 (46%)	24 (40%)	162 (45%)
Peritoneal Dialysis	22 (38%)	18 (33%)	18 (35%)	26 (43%)	29 (38%)	26 (43%)	139 (39%)
Transplant	5 (9%)	13 (24%)	10 (20%)	9 (15%)	12 (16%)	10 (17%)	59 (16%)
Total	**58**	**54**	**51**	**61**	**76**	**60**	**360**

For prevalent patients (Figure 11.5), a very different pattern is seen, with the great majority of children and adolescents with a functioning transplant. This reflects the relatively high rate of transplantation among children.

Figure 11.5

Modality of Treatment for all Patients in Australia and New Zealand < 20 Years of Age at 31st December

Current Treatment	Year						
	2004	2005	2006	2007	2008	2009	Total
Haemodialysis	55 (15%)	46 (12%)	43 (11%)	44 (12%)	49 (12%)	52 (13%)	289 (12%)
Peritoneal Dialysis	52 (14%)	44 (12%)	45 (12%)	61 (16%)	69 (17%)	68 (16%)	339 (15%)
Transplant	259 (71%)	282 (76%)	291 (77%)	276 (72%)	290 (71%)	296 (71%)	1694 (73%)
Total	**366**	**372**	**379**	**381**	**408**	**416**	**2322**

TRANSPLANT DEMOGRAPHICS

Figures 11.6-11.8 show the trends in paediatric transplantation over the 12- year period from 1998-2009. Live donor kidneys (living related and unrelated) mostly come from donors in the 35-44 year old age group. In contrast, the proportion of deceased donors aged < age 25 is higher than compared to living donors. There are no significant trends in the type of donor according to recipient age. The use of donor after cardiac death (DCD) kidneys in children and adolescents remains uncommon (~1%).

The time to first kidney transplant (Fig 11.8) has remained largely unchanged over this period.

Figure 11.6

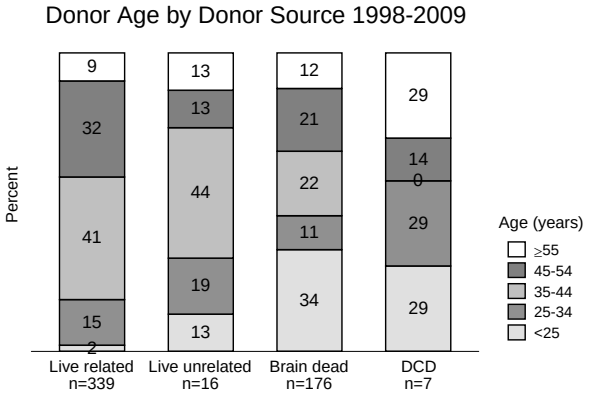


Figure 11.7

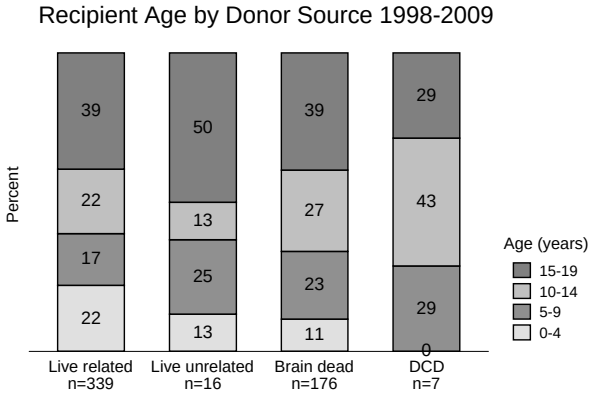
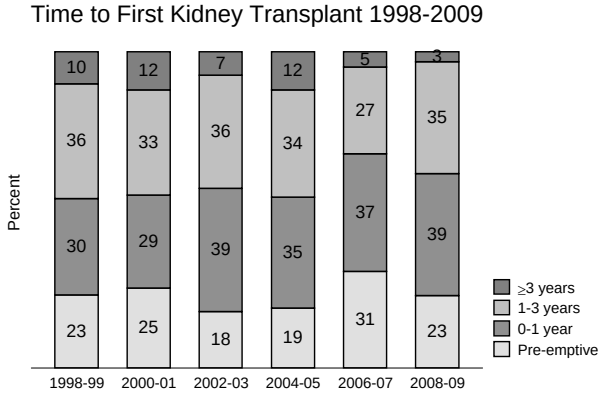


Figure 11.8



TRANSPLANT OUTCOMES

Graft and patient survival for grafts performed in Australia and New Zealand on recipients aged < 20 years, calculated by the Kaplan-Meier method, is shown in Figure 11.9. Unadjusted one, three and five year survival have remained stable over the past ten years.

Renal function at anytime post transplant has improved since the 1998-2000 cohort (Fig 11.10). There is little change in the rate of decline in renal function after the first year post transplant up to five years post-transplant.

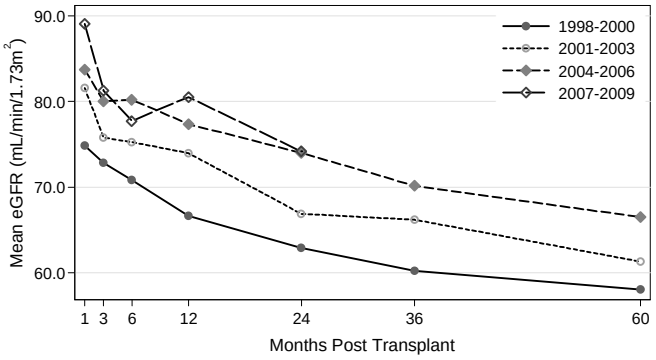
Figure 11.9

Recipient and Graft Survival
Recipients Aged < 20 Years 2000 - 2009
% [95% Confidence Interval]

Year	Survival			
	6 months	1 year	3 years	5 years
Recipient Survival				
2000-01 (n=81)	99 [92-100]	99 [92-100]	99 [92-100]	99 [92-100]
2002-03 (n=102)	93 [86-97]	91 [84-95]	90 [83-95]	90 [83-95]
2004-05 (n=107)	100	99 [93-100]	98 [93-100]	97 [91-99]
2006-07 (n=69)	100	100	99 [90-100]	-
2008-09 (n=104)	100	100	-	-
Graft Survival				
2000-01 (n=81)	98 [90-99]	96 [89-99]	91 [83-96]	88 [78-93]
2002-03 (n=102)	90 [83-95]	89 [81-94]	87 [79-92]	80 [71-87]
2004-05 (n=107)	97 [92-99]	96 [90-99]	90 [83-95]	82 [73-88]
2006-07 (n=69)	94 [85-98]	91 [82-96]	81 [69-88]	-
2008-09 (n=104)	95 [89-98]	95 [89-98]	-	-

Figure 11.10

Mean eGFR Over Time in Recipients Aged <15 Years



GFR estimated from serum creatinine using the Schwartz formula for children

Figure 11.11

Causes of Graft Failure 1998 - 2009

Reason for Failure	Age Groups (Years)				Total
	0-4	5-9	10-14	15-19	
Rejection - Acute	2 (11%)	2 (13%)	2 (6%)	5 (9%)	11 (9%)
Rejection - CAN	6 (32%)	5 (31%)	18 (58%)	19 (36%)	48 (40%)
Rejection - Hyperacute	1 (5%)	-	-	-	1 (1%)
Vascular rejection	1 (5%)	3 (19%)	-	4 (8%)	8 (7%)
Technical reasons	4 (21%)	-	5 (16%)	4 (8%)	13 (11%)
Recurrent disease	-	2 (13%)	2 (6%)	2 (4%)	6 (5%)
Non-compliance	1 (5%)	1 (6%)	1 (3%)	10 (19%)	13 (11%)
Death with function	3 (16%)	3 (19%)	-	6 (11%)	12 (10%)
Other	1 (5%)	-	3 (10%)	3 (6%)	7 (6%)
Total	**19**	**16**	**31**	**53**	**119**

IMMUNOSUPPRESSION

Tacrolimus continues to be the most commonly used calcineurin inhibitor (CNI) at induction and one year post-transplant. The proportion of patients on cyclosporin is higher in the five and ten year cohorts and reflects historical use of this agent. Within the 2004 cohort, 44% of patients were commenced on tacrolimus compared with 62% on tacrolimus at five years, indicating that a significant proportion of patients commenced on cyclosporin are subsequently switched to tacrolimus therapy.

Mycophenolate is the most commonly used antimetabolite at induction and long term use has increased over time, with only a small proportion of patients treated with azathioprine aside from the ten year cohorts.

The proportion of prednisolone-free patients at induction has returned to zero, reflecting a trend since 2005 for virtually universal use of prednisolone at induction. Similarly, there are appears to be a trend since 2005 for a decreasing proportion of steroid-free use in longer term transplants.

Figure 11.12

Calcineurin and mTOR Inhibitors at Induction Transplant Cohorts 1998-2009

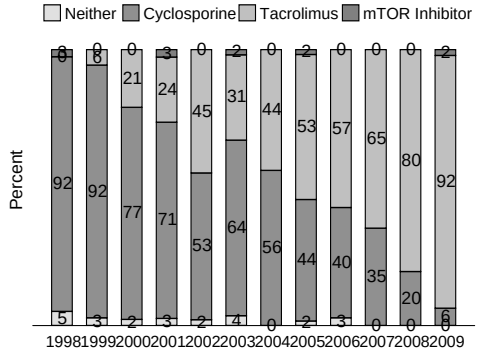


Figure 11.13

Calcineurin and mTOR Inhibitors at One Year Transplant Cohorts 1998-2008

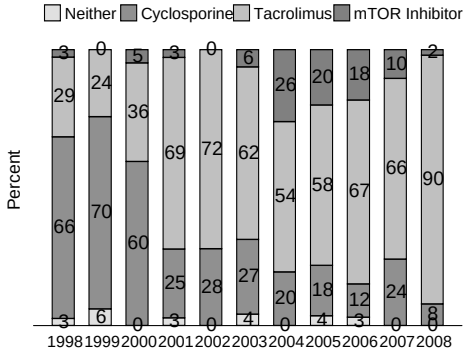


Figure 11.14

Calcineurin and mTOR Inhibitors at Five Years Transplant Cohorts 1998-2004

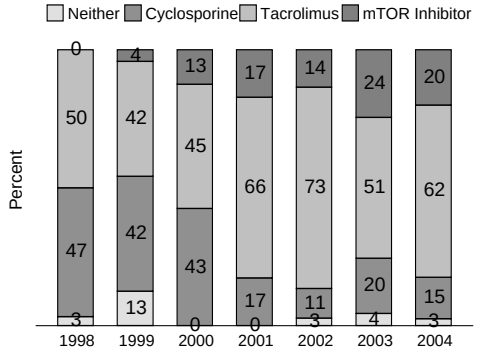
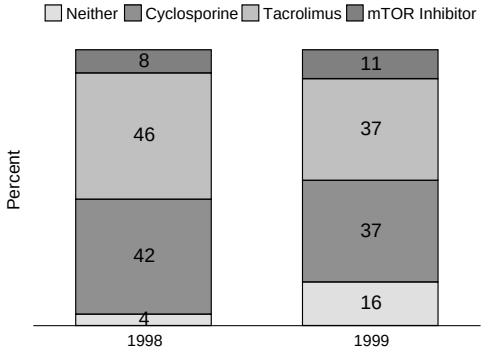


Figure 11.15

Calcineurin and mTOR Inhibitors at Ten Years Transplant Cohorts 1998-1999



IMMUNOSUPPRESSION

Figure 11.16

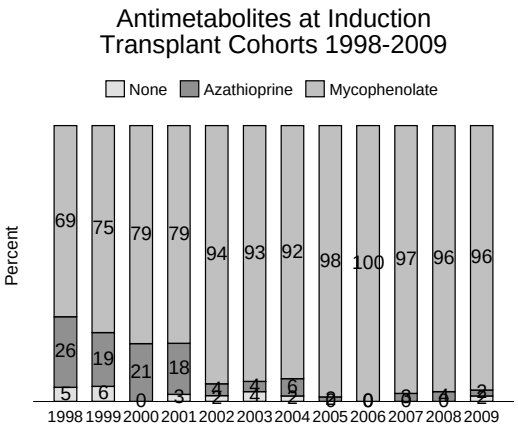


Figure 11.17

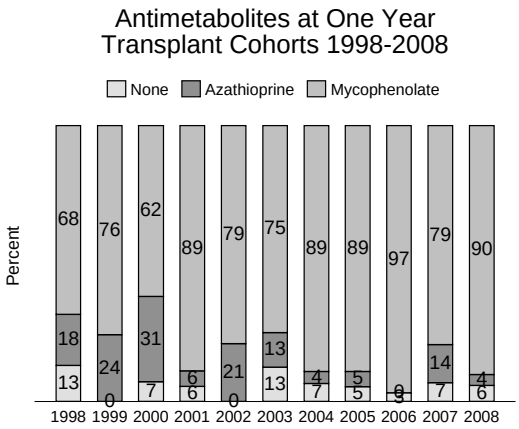


Figure 11.18

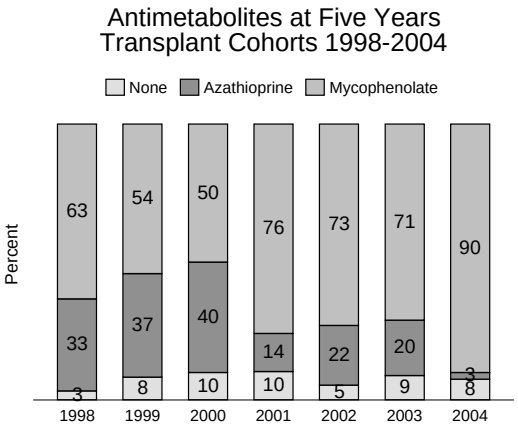


Figure 11.19

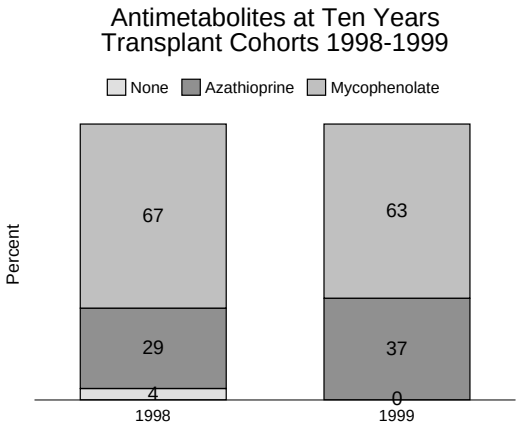
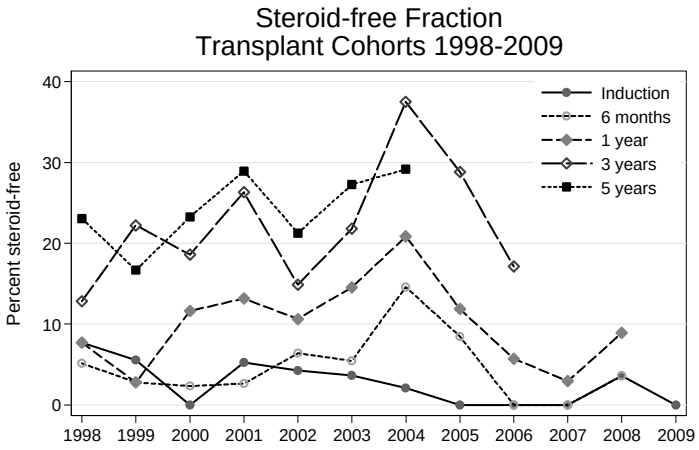


Figure 11.20



REJECTION

The proportion of patients experiencing at least one episode of acute rejection (biopsy proven or clinically diagnosed) in the first six months post-transplant has remained largely unchanged over the past five years (Fig 11.21). The incidence of rejection > 6 months post-transplant varies but on average is similar to the rate of rejection within the first six months. The use of renal biopsy to diagnose both early (< 6 months) and late (> 6 months) rejection appears to be increasing.

Figure 11.21

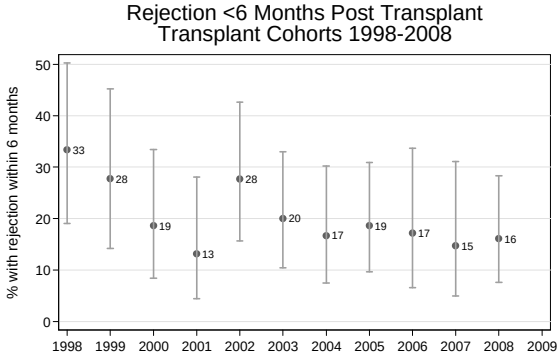


Figure 11.22

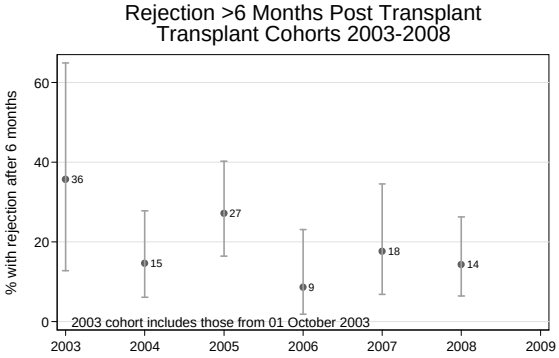


Figure 11.23

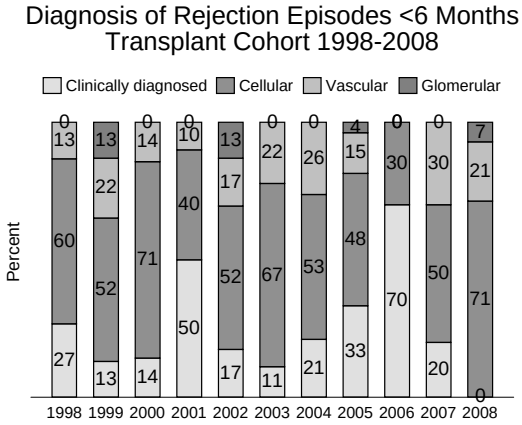
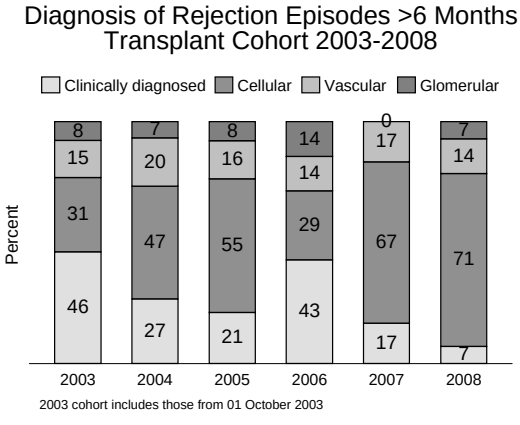


Figure 11.24



CHAPTER 12

END-STAGE KIDNEY DISEASE AMONG INDIGENOUS PEOPLES OF AUSTRALIA AND NEW ZEALAND

Stephen McDonald
Leonie Excell
Matthew Jose

INTRODUCTION

In this chapter, rates of end-stage kidney disease among the Indigenous Peoples of Australia and New Zealand are substantially increased compared with the non-indigenous comparisons.

We have extended the analyses of treated ESKD among indigenous people, and drawn together analyses from elsewhere in the report into a separate chapter.

Figure 12.1

New Patients 2000 - 2009
(% Dialysis Patients on Haemodialysis)

		Australia		New Zealand		
Mode of Treatment		ATSI	Non-Indigenous	Maori	Pacific People	Non-Indigenous
2000	PD	28	399	46	17	78
	HD	122 (81%)	1159 (74%)	82 (64%)	53 (76%)	128 (62%)
2001	PD	32	451	55	15	109
	HD	142 (82%)	1236 (73%)	94 (63%)	53 (78%)	128 (54%)
2002	PD	23	468	51	9	102
	HD	150 (87%)	1186 (72%)	98 (66%)	47 (84%)	141 (58%)
2003	PD	27	468	44	13	95
	HD	146 (84%)	1280 (73%)	102 (70%)	64 (83%)	132 (58%)
2004	PD	27	414	54	12	106
	HD	168 (86%)	1284 (76%)	88 (62%)	52 (81%)	134 (56%)
2005	PD	29	450	40	20	88
	HD	187 (86%)	1543 (77%)	98 (71%)	54 (73%)	148 (63%)
2006	PD	31	551	47	17	95
	HD	190 (86%)	1585 (74%)	121 (72%)	62 (78%)	145 (60%)
2007	PD	56	531	36	13	82
	HD	181 (76%)	1545(74%)	108 (75%)	63 (83%)	138 (63%)
2008	PD	52	603	35	22	95
	HD	197 (79%)	1583 (72%)	119 (77%)	65 (75%)	137 (59%)
2009	PD	35	530	52	22	121
	HD	152 (81%)	1502 (74%)	116 (69%)	77 (78%)	155 (56%)

NEW PATIENTS

Figures 12.1 - 12.7

Australia

A total of 187 Aboriginal and Torres Strait Islander People commenced dialysis during 2009. This number decreased from 249 in 2008 and 237 in 2007.

The majority (81%) are treated with haemodialysis; in 2009 the number of people commencing PD (35 patients) was less than the previous two years.

New Zealand

The number of Maori and Pacific People starting dialysis continues to increase in 2009 (168 patients and 99 patients) respectively.

More Maori patients commenced on PD in 2009 than in the previous four years while the number of Pacific People starting PD remained the same as 2008

Figure 12.2

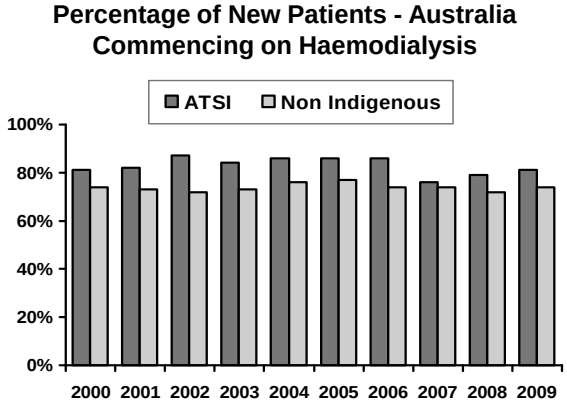
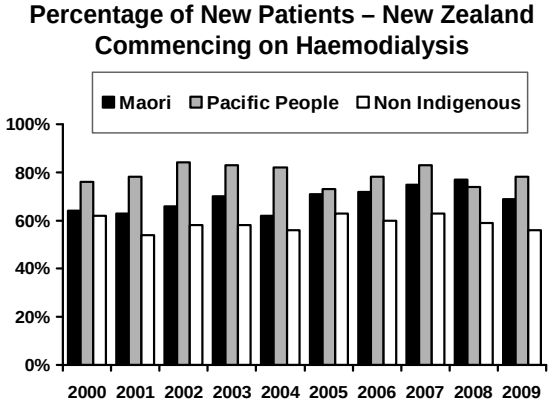


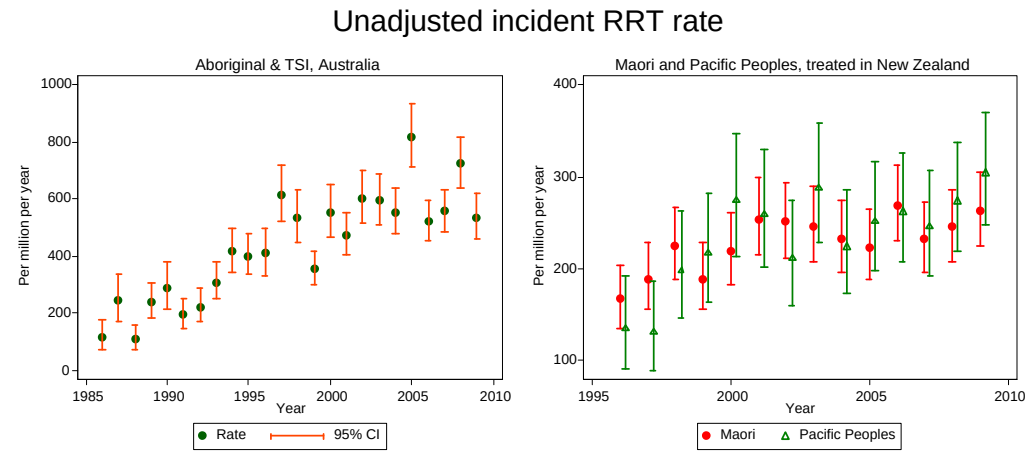
Figure 12.3



INCIDENCE RATE

Overall, the incidence rate (per million population) of indigenous people is considerably greater than that for non-indigenous people. Direct comparisons are confounded by the different age distributions - the indigenous population is considerably younger than the non-indigenous population. However, there does appear to have been a stabilisation of incident rates among Aboriginal Australians. In contrast, rates among Maori and Pacific Peoples in New Zealand have increased progressively in the last few years. The relative rate differs with age and also with gender - this is illustrated in Figure 12.5.

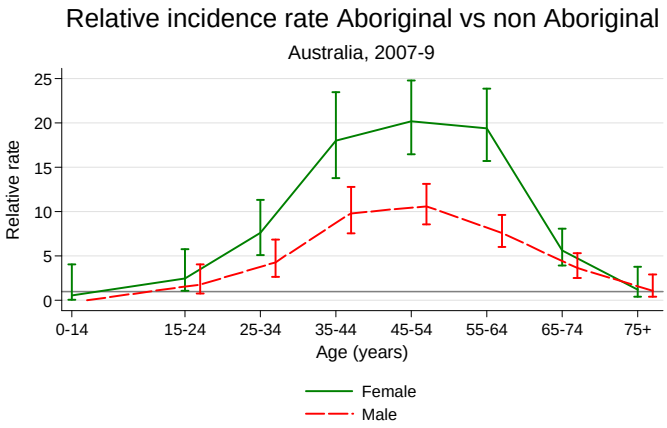
Figure 12.4



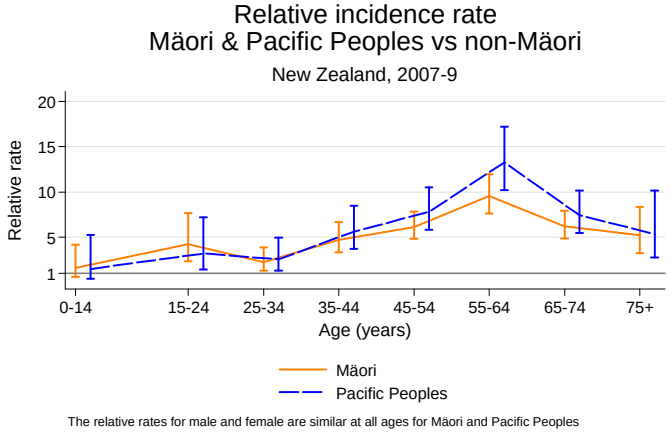
ANZDATA
Note X and Y scales differ

Figure 12.5

Among Aboriginal Australians, there is a marked excess rate among those aged 35-64 years. The relative rate is higher among females than males.



Among Maori and Pacific People the excess rate is concentrated among older groups, and there is no gender difference.

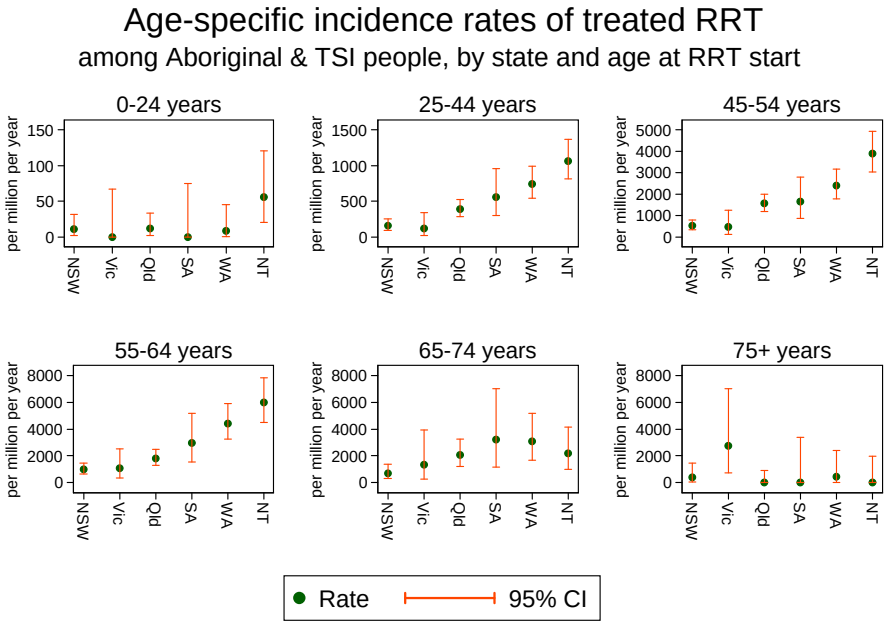


The relative rates for male and female are similar at all ages for Mäori and Pacific Peoples

There is also considerable variation between Australian jurisdictions in the Aboriginal/TSI RRT incident rates. The incidence rates for each State/Territory can be seen in Figure 12.6.

While rates for the very young (<15 years) and older (>65 years) groups are similar in each State/Territory, the rates for people 25-65 years of age show a clear trend of progressively higher rates from NSW/Victoria to Queensland then South Australia, Western Australia and the Northern Territory. Data is shown for a three year period given the small numbers in some locations.

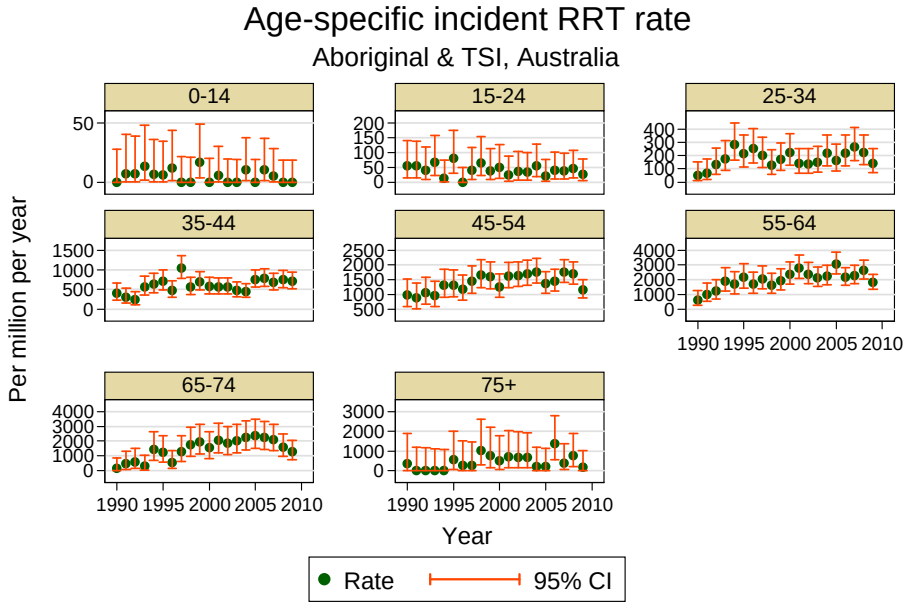
Figure 12.6



ANZDATA and ABS data, 2007-9

The overall stabilisation of rates among Aboriginal Australians is seen consistently across each age group. In some age groups (such as 65-74 years) there is a suggestion of a downwards trend. There are a number of factors which contribute to incident numbers of RRT (among both indigenous and non-indigenous people). It is not clear whether this stabilisation reflects the underlying rates of diabetes, rates of disease progression, referral patterns or other diseases.

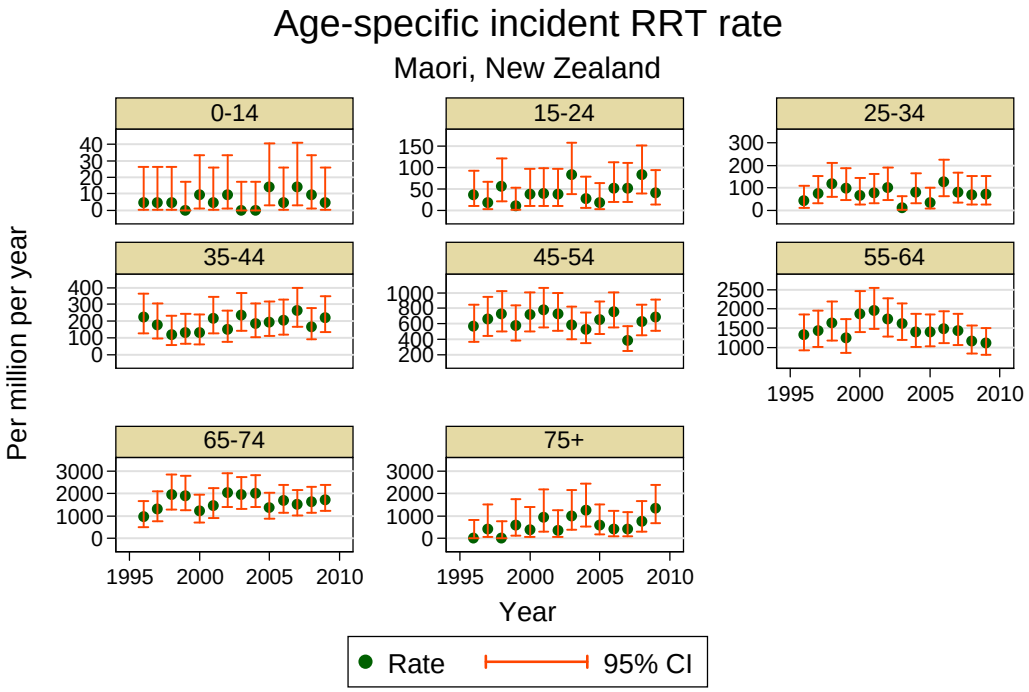
Figure 12.7



note: Y axis scales differ

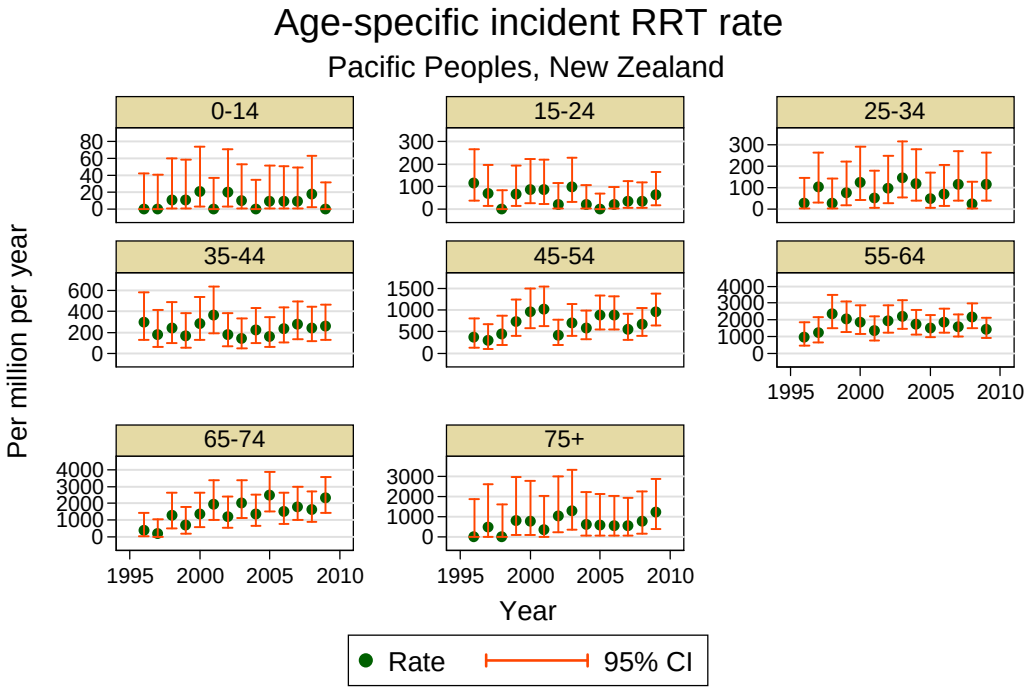
Age specific trends for Maori and Pacific Peoples are shown in Figures 12.8 and 12.9

Figure 12.8



note: Y axis scales differ

Figure 12.9



note: Y axis scales differ

NEW TRANSPLANTS

Figure 12.10

In both Australia and New Zealand numbers of transplants to indigenous recipients were low.

Australia

Twenty four transplant operations were performed in Aboriginal and Torres Strait Islander recipients in 2009, of which four (20%) were from living donors.

New Zealand

The number of Maori transplanted has increased from five patients in 2008 to eleven patients in 2009, with 42% from living donors.

Pacific People had five deceased donor and one (20%) living donor

Figure 12.10

New Transplants 2000 - 2009
(% Transplants with Living Donor)

		Australia		New Zealand		
Year	Donor Source	ATSI	Non-Indigenous	Maori	Pacific People	Non-Indigenous
2000	DD	15	335	11	3	61
	LD	3 (17%)	178 (35%)	2 (15%)	1 (25%)	28 (31%)
2001	DD	18	310	10	5	52
	LD	3 (14%)	210 (40%)	5 (33%)	1 (17%)	37 (42%)
2002	DD	17	357	10	13	46
	LD	0 (0%)	230 (39%)	3 (23%)	2 (13%)	43 (48%)
2003	DD	10	315	8	11	48
	LD	3 (23%)	215 (41%)	8 (50%)	3 (21%)	33 (41%)
2004	DD	22	384	7	8	42
	LD	4 (15%)	240 (38%)	5 (42%)	4 (33%)	39 (48%)
2005	DD	19	358	3	2	42
	LD	3 (14%)	243 (40%)	0 (0%)	2 (50%)	44 (51%)
2006	DD	24	344	6	4	31
	LD	3 (11%)	270 (44%)	4 (40%)	3 (43%)	42 (57%)
2007	DD	14	330	8	2	55
	LD	4 (22%)	267 (45%)	9 (53%)	4 (67%)	45 (45%)
2008	DD	24	435	5	6	42
	LD	7 (23%)	347 (44%)	7 (58%)	4 (40%)	58 (58%)
2009	DD	20	426	11	5	38
	LD	4 (20%)	322 (43%)	8 (42%)	1 (20%)	58 (60%)

PREVALENCE

Figure 12.11

Australia

The number of prevalent Aboriginal and Torres Strait Islander People with treated end-stage kidney disease increased by only 1% in 2009 after a 6% increase in 2008.

The percentage of ATSI on home haemodialysis rose from 5% in 2008 to 7% in 2009.

The percentage of ATSI treated with peritoneal dialysis decreased by 16% in 2009 after an increase of 5% in 2008.

New Zealand

The number of prevalent Maori with treated end-stage kidney disease rose by 6% whilst Pacific People increased by 10% in 2009.

The percentage of Maori (25%) treated with home haemodialysis remains similar to past years, whilst in Pacific People this percentage (14%) also remained similar since 2005.

The use of peritoneal dialysis in the Maori population increased by 5% whilst in Pacific Islanders remained similar in 2009 to the previous year.

Figure 12.11

Prevalent Patients 2005 - 2009
(% Haemodialysis Patients on Home HD)

		Australia		New Zealand		
Year	Mode of Treatment	ATSI	Non-Indigenous	Maori	Pacific People	Non-Indigenous
2005	PD	144	1716	236	91	391
	HD	780 (5%)	5999 (13%)	404 (26%)	260 (10%)	496 (33%)
	Func TX*	134	6426	107	70	1043
2006	PD	149	1898	247	88	431
	HD	839 (6%)	6370 (13%)	436 (25%)	283 (14%)	513 (34%)
	Func TX*	148	6726	106	75	1048
2007	PD	156	1979	231	89	425
	HD	934 (6%)	6649 (143)	456 (24%)	320 (12%)	548 (33%)
	Func TX*	148	6973	108	76	1087
2008	PD	167	2070	222	108	432
	HD	990 (5%)	6908 (13%)	465 (24%)	325 (14%)	550 (32%)
	Func TX*	159	7362	112	82	1131
2009	PD	141	2036	234	109	447
	HD	1033 (7%)	7131 (13%)	489 (25%)	376 (14%)	605 (32%)
	Func TX*	160	7766	121	84	1174

* By Resident Country at 31st December

INCIDENCE AND PREVALENCE BY STATE/TERRITORY

Figures 12.12 - 12.17 show various comparisons between States/Territories. This includes both incidence and treatment related information. Corresponding New Zealand data is shown in Figures 12.18 - 12.23

State Incidence

The Northern Territory has the highest national incidence among indigenous people of treated end-stage kidney disease in Australia at 925 pmp, the next highest is in South Australia (534 pmp). Detailed data are given in Figure 12.24.

Dialysis by Resident State

Treatment patterns for Aboriginal and Torres Strait Islander People vary by State. The highest rates are in the Northern Territory, Western Australia and South Australia.

Transplant by Referring State

Rates of prevalent transplants vary substantially between States with highest rates in South Australia.

These rates are per population, not per dialysis patient, and they reflect both background rates of kidney disease and transplant rates.

Figure 12.12

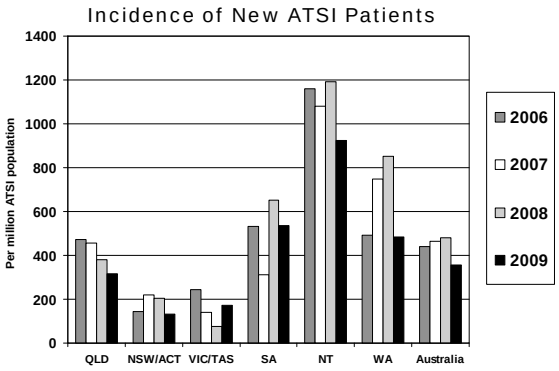


Figure 12.13

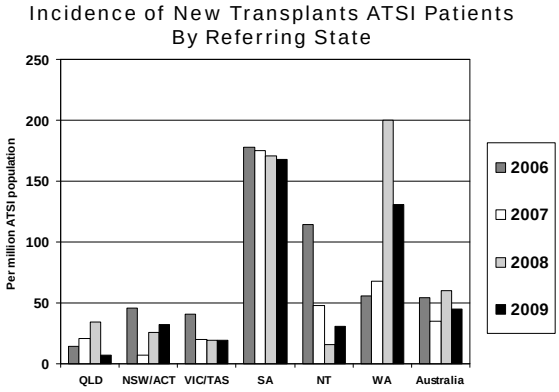


Figure 12.14

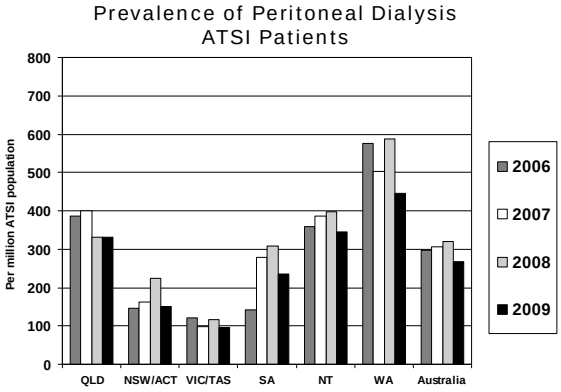


Figure 12.15

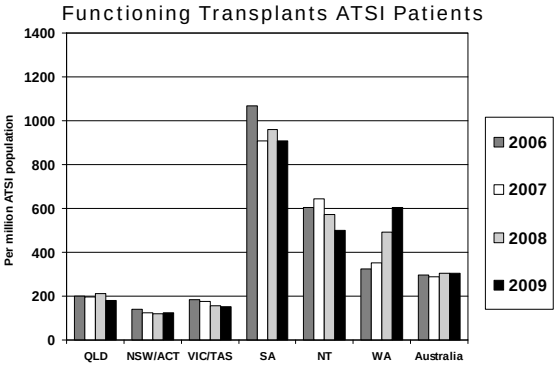


Figure 12.16

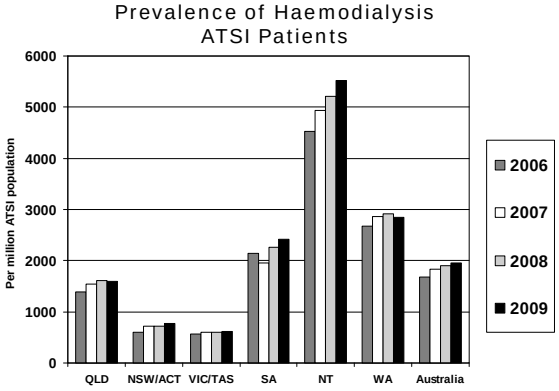
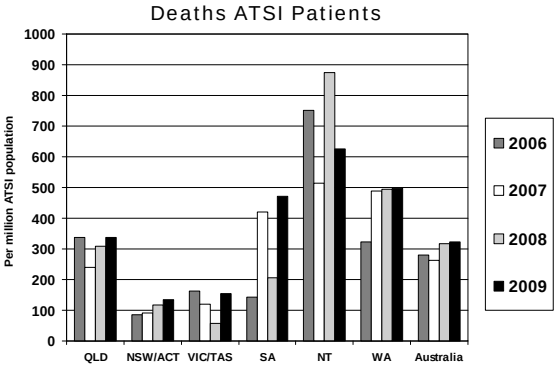


Figure 12.17



INCIDENCE AND PREVALENCE OF MAORI AND PACIFIC PEOPLE IN NEW ZEALAND

Figure 12.18

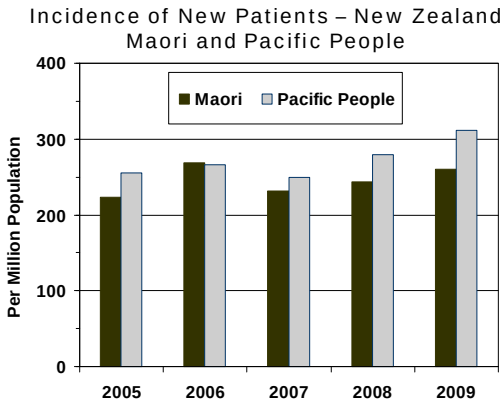


Figure 12.19

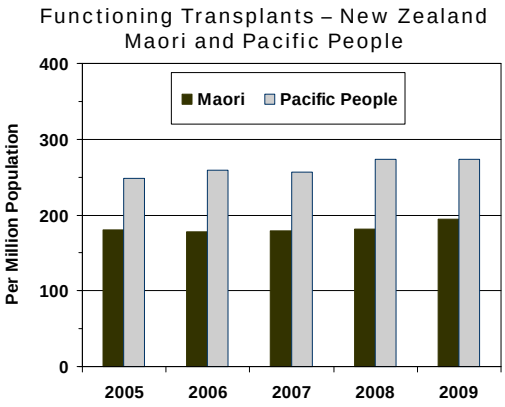


Figure 12.20

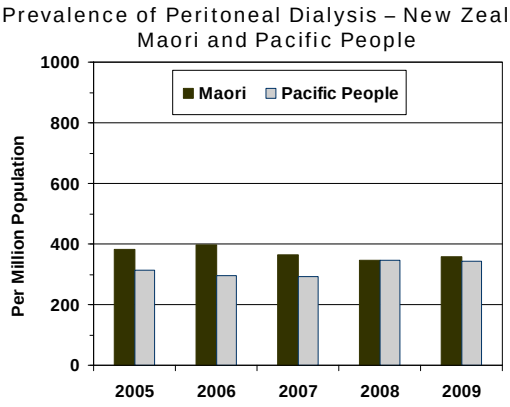


Figure 12.21

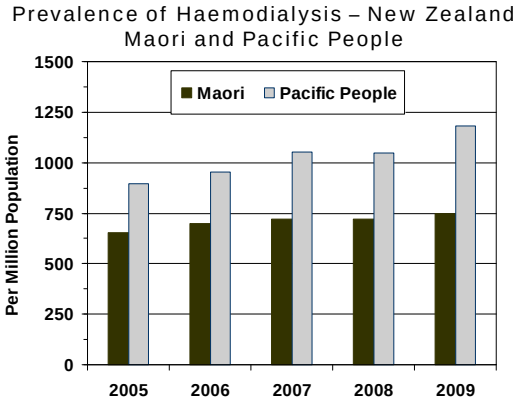


Figure 12.22

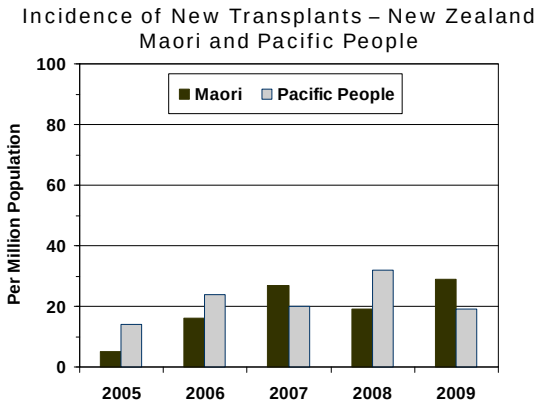
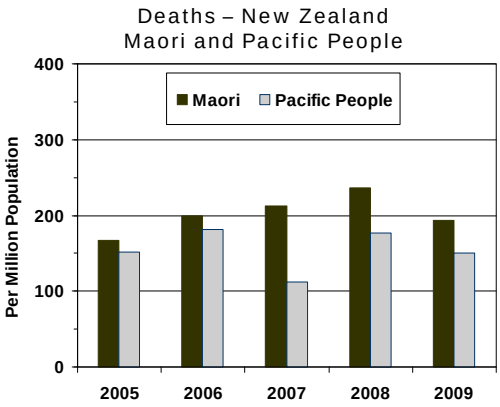


Figure 12.23



INCIDENCE AND PREVALENCE BY STATE/TERRITORY

Detailed data about States/Territories is presented in Figure 12.24.

Figure 12.24

Incidence and Prevalence - Aboriginal And Torres Strait Islanders 2005 - 2009 by Resident State

(Number per million ATSI population in each State)

		QLD	NSW / ACT	Vic / Tas	SA	NT	WA	Australia
2005	New Patients	47 (344)	26 (176)	6 (123)	16 (580)	76 (1259)	45 (634)	**216 (438)**
	Prevalent PD	46 (336)	20 (135)	6 (123)	4 (145)	27 (447)	41 (578)	**144 (292)**
	Prevalent HD	183 (1338)	92 (621)	23 (473)	55 (1994)	250 (4141)	176 (2480)	**780 (1583)**
	Functioning Transplants	29 (212)	14 (95)	9 (185)	26 (943)	34 (563)	22 (310)	**134 (272)**
	Transplant Ops *	2 (15)	1 (7)	3 (62)	4 (145)	4 (66)	8 (113)	**22 (45)**
	Deaths	34 (249)	18 (122)	2 (41)	5 (181)	38 (629)	22 (310)	**119 (242)**
2006	New Patients	66 (473)	22 (146)	12 (244)	15 (534)	71 (1160)	35 (491)	**221 (441)**
	Prevalent PD	54 (387)	22 (146)	6 (122)	4 (142)	22 (359)	41 (575)	**149 (297)**
	Prevalent HD	193 (1383)	90 (598)	28 (568)	60 (2135)	277 (4523)	190 (2667)	**839 (1673)**
	Functioning Transplants	28 (201)	21 (139)	9 (183)	30 (1067)	37 (604)	23 (323)	**148 (295)**
	Transplant Ops *	2 (14)	7 (46)	2 (41)	5 (178)	7 (114)	4 (56)	**27 (54)**
	Deaths	47 (337)	13 (86)	8 (162)	4 (142)	46 (751)	23 (323)	**141 (281)**
2007	New Patients	65 (457)	34 (222)	7 (139)	9 (314)	67 (1079)	55 (748)	**237 (464)**
	Prevalent PD	57 (400)	25 (163)	5 (99)	8 (279)	24 (387)	37 (503)	**156 (306)**
	Prevalent HD	220 (1546)	109 (712)	30 (594)	56 (1955)	307 (4945)	211 (2868)	**934 (1830)**
	Functioning Transplants	28 (197)	19 (124)	9 (178)	26 (908)	40 (644)	26 (353)	**148 (290)**
	Transplant Ops *	3 (21)	1 (7)	1 (20)	5 (175)	3 (48)	5 (68)	**18 (35)**
	Deaths	34 (239)	14 (91)	6 (119)	12 (419)	32 (515)	36 (489)	**134 (263)**
2008	New Patients	55 (379)	32 (206)	4 (78)	19 (651)	75 (1192)	64 (854)	**249 (479)**
	Prevalent PD	48 (331)	35 (225)	6 (117)	9 (308)	25 (397)	44 (587)	**167 (321)**
	Prevalent HD	235 (1619)	112 (720)	31 (602)	66 (2261)	328 (5212)	218 (2910)	**990 (1906)**
	Functioning Transplants	31 (214)	19 (122)	8 (155)	28 (959)	36 (572)	37 (494)	**159 (306)**
	Transplant Ops *	5 (34)	4 (26)	1 (19)	5 (171)	1 (16)	15 (200)	**31 (60)**
	Deaths	45 (310)	18 (116)	3 (58)	6 (206)	55 (874)	37 (494)	**164 (316)**
2009	New Patients	47 (316)	21 (133)	9 (172)	16 (538)	59 (925)	37 (485)	**189 (358)**
	Prevalent PD	49 (331)	24 (152)	5 (95)	7 (235)	22 (345)	34 (446)	**141 (267)**
	Prevalent HD	237 (1601)	123 (778)	32 (610)	72 (2421)	352 (5519)	217 (2845)	**1033 (1954)**
	Functioning Transplants	27 (182)	20 (126)	8 (153)	27 (908)	32 (502)	46 (603)	**160 (303)**
	Transplant Ops *	1 (7)	5 (32)	1 (19)	5 (168)	2 (31)	10 (131)	**24 (45)**
	Deaths	50 (338)	21 (133)	8 (153)	14 (471)	40 (627)	38 (498)	**171 (323)**

* By Referring State, not State of Transplantation

The per million population figures have been calculated from the estimated indigenous populations of each States published in the Australian Bureau of Statistics document 3238.0 Experimental Projections of the Indigenous Population 1991 to 2009 (low series).

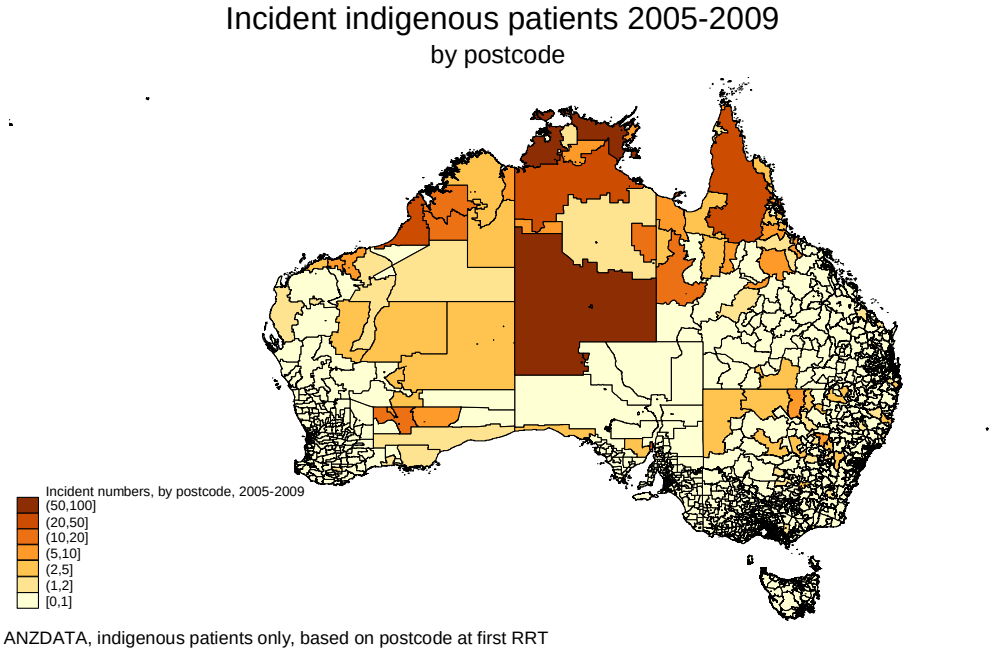
PREVALENT INDIGENOUS DIALYSIS PATIENTS 2009

BY STATISTICAL SUBDIVISION

DERIVED FROM POSTCODE REPORTED TO ANZDATA

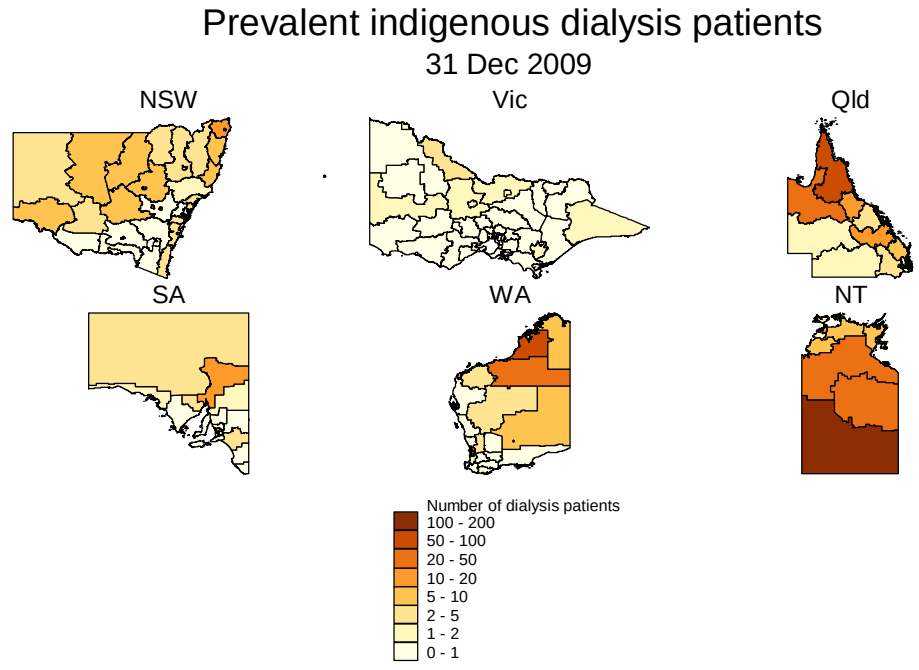
Figure 12.25 shows graphically the distribution of incident ATSI patients (by postcode) and prevalent dialysis patients are summarised in Figure 12.26 by statistical subdivision (obtained by mapping postcodes to SSD). Note that some postcodes were distributed over more than one SSD.

Figure 12.25



ANZDATA, indigenous patients only, based on postcode at first RRT

Figure 12.26



ANZDATA, based on postcode of residence reported at at end 2009
mapped to SSD using ABS concordance files

LATE REFERRAL

Australia

The percentage of Aboriginal and Torres Strait Islander People referred late for treatment decreased to 21.2% (40/189 patients) in 2009 from 24.5% (61/249 patients) the previous year (Figure 12.27).

Most (58.5%) commenced haemodialysis using a catheter in 2009 (Figure 12.28).

New Zealand

The total number of Maori people referred late in 2009 decreased from 31.2% (49/157 patients) in 2008 to 21.8% (37/170 patients) in 2009. Pacific People referred late decreased to 31.1% (13/99 patients) in 2009 from 21.8% (19/87 patients) the previous year.

Most Maori (71.6%) and Pacific People (61%) commenced haemodialysis with a catheter (Figure 12.28).

Figure 12.27

Late Referral 2005 - 2009

% Late Referral of (Total Number of Patients)

	Australia		New Zealand		
Year	ATSI	Non-Indigenous	Maori	Pacific People	Non-Indigenous
2005	33.8% (216)	23.1% (2075)	33.3% (138)	23.0% (74)	13.6% (249)
2006	35.7% (221)	21.6% (2209)	29.1% (168)	17.7% (79)	18.5% (253)
2007	31.6% (237)	22.7% (2141)	16.3% (147)	30.3% (76)	20.2% (243)
2008	24.5% (249)	21.6% (2285)	31.2% (157)	21.8% (87)	17.3% (253)
2009	21.2% (189)	21.3% (2148)	21.8% (170)	13.1% (99)	14.8% (298)

VASCULAR ACCESS

For all indigenous groups in Australia and New Zealand there has been a progressive improvement in vascular access (at first dialysis) over the past five years.

Figure 12.28

Vascular Access Use at First ESRF Treatment
Where this is Haemodialysis 2005 - 2009

(% Using CVC)

		Australia		New Zealand		
Year	Vascular Access	ATSI	Non-Indigenous	Maori	Pacific People	Non-Indigenous
2005	AVF/AVG	58	592	17	14	54
	CVC	129 (68.9%)	951 (61.6%)	81 (82.6%)	40 (74.1%)	94 (63.5%)
2006	AVF/AVG	55	632	24	15	38
	CVC	135 (71.1%)	953 (60.1%)	97 (80.2%)	47 (75.8%)	107 (73.7%)
2007	AVF/AVG	57	643	27	12	38
	CVC	124 (68.5%)	902 (58.3%)	81 (75.0%)	51 (80.9%)	100 (72.4%)
2008	AVF/AVG	77	618	29	9	35
	CVC	120 (60.9%)	965 (60.9%)	90 (75.6%)	56 (86.1%)	102 (74.5%)
2009	AVF/AVG	63	648	33	30	46
	CVC	89 (58.5%)	854 (56.8%)	83 (71.6%)	47 (61.0%)	109 (70.3%)

CAUSE OF DEATH

Australia

Cardiac events (37%) were the most common cause of death for Aboriginal and Torres Strait Islander People on dialysis, followed by "social causes" (24%) and infection (19%). In 2009, the most common cause of death in transplanted Aboriginal and Torres Strait Islander People was infection (60%) and cardiac and "social causes" both (20%).

New Zealand

Cardiac events were the most common cause of death in Maori (52%) and Pacific People (46%) treated with dialysis, followed by "social causes" (19%) for Maori and vascular (17%) for Pacific People. In transplanted people malignancy was the most common cause of death for Maori and cardiac and infection for Pacific People, although the overall number of deaths is small.

Figure 12.29

Cause of Death 2008 - 2009

			Australia		New Zealand		
	Mode of Treatment	Cause of Death	ATSI	Non-Indigenous	Maori	Pacific People	Non-Indigenous
2008	**Dialysis**	Cardiac	60 (38%)	444 (33%)	70 (47%)	27 (49%)	50 (32%)
		Vascular	10 (6%)	112 (9%)	13 (8%)	4 (7%)	10 (6%)
		Infection	30 (19%)	137 (10%)	25 (17%)	16 (29%)	25 (16%)
		Social	32 (20%)	517 (39%)	22 (15%)	3 (5%)	46 (30%)
		Malignancy	7 (4%)	85 (6%)	7 (4%)	3 (5%)	15 (10%)
		Miscellaneous	19 (12%)	40 (3%)	13 (9%)	2 (4%)	9 (6%)
		Total	**158**	**1335**	**150**	**55**	**155**
	Transplant	Cardiac	2 (33%)	45 (26%)	1 (50%)	-	9 (35%)
		Vascular	-	14 (8%)	-	-	-
		Infection	4 (67%)	25 (15%)	-	-	5 (19%)
		Social	-	10 (6%)	-	-	-
		Malignancy	-	54 (31%)	-	-	8 (31%)
		Miscellaneous	-	24 (14%)	1 (50%)	-	4 (15%)
		Total	**6**	**1722**	**2**	**-**	**26**
2009	**Dialysis**	Cardiac	59 (37%)	456 (33%)	63 (52%)	21 (46%)	64 (39%)
		Vascular	15 (9%)	122 (9%)	11 (9%)	8 (17%)	13 (8%)
		Infection	30 (19%)	146 (11%)	16 (13%)	7 (15%)	23 (14%)
		Social	39 (24%)	526 (39%)	23 (19%)	7 (15%)	53 (32%)
		Malignancy	6 (4%)	65 (5%)	4 (3%)	2 (4%)	6 (4%)
		Miscellaneous	12 (7%)	49 (4%)	4 (3%)	1 (2%)	5 (3%)
		Total	**161**	**1364**	**121**	**46**	**164**
	Transplant	Cardiac	2 (20%)	31 (24%)	1 (20%)	1 (50%)	7 (26%)
		Vascular	-	17 (13%)	-	-	-
		Infection	6 (60%)	22 (17%)	1 (20%)	1 (50%)	1 (4%)
		Social	2 (20%)	9 (7%)	1 (20%)	-	1 (4%)
		Malignancy	-	38 (29%)	2 (40%)	-	15 (55%)
		Miscellaneous	-	14 (11%)	-	-	3 (11%)
		Total	**10**	**131**	**5**	**2**	**27**