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

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ANZDATA Registry Report 2007
Australia and New Zealand Dialysis and Transplant Registry
Adelaide, South Australia.

Editors: Stephen McDonald, Sean Chang and Leonie Excell

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

### CONTENTS

<table>
<thead>
<tr>
<th>NEW PATIENTS</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of New Patients in each Australian State - 1963-2006</td>
<td>3</td>
</tr>
<tr>
<td>Number of New Patients by Age Group - 1963-2006</td>
<td>4</td>
</tr>
<tr>
<td>Number of New Patients in Each Age Group by Gender - Australian States 2001-2006</td>
<td>5-6</td>
</tr>
<tr>
<td>Number of New Patients by Racial Origin - Australian States 2003-2006</td>
<td>7</td>
</tr>
<tr>
<td>Primary Renal Disease and Age of New Patients - 2002-2006</td>
<td>8</td>
</tr>
<tr>
<td>Primary Renal Disease and Age of New Patients - Australian States 2005-2006</td>
<td>9-11</td>
</tr>
<tr>
<td>Primary Renal Disease of New Patients - Australia and New Zealand 1991-2006</td>
<td>12</td>
</tr>
<tr>
<td>Primary Renal Disease of New Patients - Australian States 1991-2006</td>
<td>12-13</td>
</tr>
</tbody>
</table>

### DIALYSIS

<table>
<thead>
<tr>
<th></th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age and Treatment of Dialysis Patients - 2001-2006</td>
<td>19</td>
</tr>
<tr>
<td>Age and Treatment of Dialysis Patients by Gender - 2004-2006</td>
<td>20</td>
</tr>
<tr>
<td>Age and Treatment of Indigenous / non Indigenous Patients - 2001 - 2006</td>
<td>21-22</td>
</tr>
<tr>
<td>Race, Primary Renal Disease and Age of Dialysis Patients - Australia 2006</td>
<td>38</td>
</tr>
<tr>
<td>Race, Primary Renal Disease and Age of Dialysis Patients - Australian States 2006</td>
<td>39-44</td>
</tr>
</tbody>
</table>

### TRANSPLANTATION

<table>
<thead>
<tr>
<th></th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functioning Transplants - By Country of Transplant - 31st December 2003-2006</td>
<td>45</td>
</tr>
<tr>
<td>Gender, Race and Age of Functioning Transplants - Resident Australian States 2006</td>
<td>48-49</td>
</tr>
<tr>
<td>Gender, Race and Age of Functioning Transplants - Resident Country - 2004-2006</td>
<td>50</td>
</tr>
<tr>
<td>Gender and Race of Functioning Transplants - Resident Australian States 2001-2006</td>
<td>51-52</td>
</tr>
<tr>
<td>Functioning Transplants by Race, Primary Renal Disease and Age - 31st December 2006</td>
<td>53</td>
</tr>
<tr>
<td>Donor Source and Recipient Age for Transplant Operations - 2002-2006</td>
<td>54</td>
</tr>
<tr>
<td>Donor Source and Recipient Age for Transplant Operations - Transplanting States 2005-2006</td>
<td>55</td>
</tr>
<tr>
<td>Donor Source and Recipient Age for Transplant Operations - Referring States 1991-2006</td>
<td>56</td>
</tr>
<tr>
<td>Race and Primary Renal Disease of New TransplantedPatients - 1994-2006</td>
<td>57</td>
</tr>
<tr>
<td>Cause of Graft Loss - 1996-2006</td>
<td>58</td>
</tr>
<tr>
<td>Year of Graft Loss due to Death or Failure - Age Related - 1996-2006</td>
<td>59</td>
</tr>
</tbody>
</table>

### DEATHS

<table>
<thead>
<tr>
<th></th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death and Mode of Treatment - 2001-2006</td>
<td>60</td>
</tr>
<tr>
<td>Death and Mode of Treatment - Australian States 2006</td>
<td>61</td>
</tr>
<tr>
<td>Cause of Deaths - Haemodialysis and Peritoneal Dialysis 2006</td>
<td>62</td>
</tr>
<tr>
<td>Cause of Deaths - Peritoneal Dialysis and Transplant 2006</td>
<td>63</td>
</tr>
<tr>
<td>Site and Type of Infection Causing Death - 2006</td>
<td>64-65</td>
</tr>
<tr>
<td>Cause of all Deaths by Gender and Race - Female -2006</td>
<td>66</td>
</tr>
<tr>
<td>Cause of all Deaths by Gender and Race - Male - 2006</td>
<td>67</td>
</tr>
<tr>
<td>Cause of Dialysis Deaths - Australian States - 1992-2006</td>
<td>68</td>
</tr>
<tr>
<td>Cause of Transplant Deaths - Australian States - 1992-2006</td>
<td>69</td>
</tr>
<tr>
<td>Cause of Deaths by Racial Origin - Dialysis and Transplant - Australia 1993-2006</td>
<td>70</td>
</tr>
<tr>
<td>Treatment Withdrawal Related to Treatment Mode, Disease, Gender and Age - 2004-2006</td>
<td>71</td>
</tr>
</tbody>
</table>

### CoMORBIDITY

<table>
<thead>
<tr>
<th></th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of CoMorbid Factors at Entry - 2006</td>
<td>72</td>
</tr>
<tr>
<td>CoMorbid Conditions at Entry - 2006</td>
<td>73</td>
</tr>
<tr>
<td>CoMorbid Conditions at Entry - Non Diabetic Primary Renal Disease Patients - 2002-2006</td>
<td>74</td>
</tr>
<tr>
<td>CoMorbid Conditions at Entry - Diabetic Primary Renal Disease Patients - 2002-2006</td>
<td>75</td>
</tr>
<tr>
<td>Race and Age of New CoMorbid Diabetic / Non Diabetic Patients - Australia-2006</td>
<td>76</td>
</tr>
<tr>
<td>Race of New CoMorbid Diabetic / Non Diabetic Patients - Australia Australia 1995-2006</td>
<td>77</td>
</tr>
<tr>
<td>CoMorbid Conditions at Entry - All Patients - Each Year - 1995-2006</td>
<td>78</td>
</tr>
<tr>
<td>CoMorbid Conditions at Entry - Caucasoid Patients - Each Year - 1995-2006</td>
<td>79</td>
</tr>
<tr>
<td>CoMorbid Conditions at Entry - Aboriginal/Torres St Islanders - Each Year - 1995-2006</td>
<td>80</td>
</tr>
<tr>
<td>CoMorbid Conditions at Entry - Asian Patients - Each Year - 1995-2006</td>
<td>81</td>
</tr>
<tr>
<td>CoMorbid Conditions at Entry- Haemodialysis and Peritoneal Dialysis as First Treatment 2006</td>
<td>82-83</td>
</tr>
</tbody>
</table>

### PATIENT DATA - TRANSPLANT AND DIALYSIS AS AT 31ST DECEMBER 2006

<table>
<thead>
<tr>
<th></th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currently Functioning Transplant - Transplant Functioning Australia and New Zealand &gt;25 years</td>
<td>84-87</td>
</tr>
<tr>
<td>Currently Functioning Transplant - Third, Fourth, Fifth Graft - Australia and New Zealand</td>
<td>88-89</td>
</tr>
<tr>
<td>Currently Functioning Non Related Live Donor Transplant - Australia and New Zealand</td>
<td>90</td>
</tr>
<tr>
<td>Uninterrupted Dialysis for &gt;14 years - Australia and New Zealand - December 2006</td>
<td>91</td>
</tr>
<tr>
<td>Longest Surviving Patients &gt;27 years (Previously transplanted) Dialysis Dependence December 2006</td>
<td>92</td>
</tr>
</tbody>
</table>

### HAEMODIALYSIS ANALYSIS RELATED TO AGE GROUPS

<table>
<thead>
<tr>
<th></th>
<th>PAGE</th>
</tr>
</thead>
</table>

### IMMUNOSUPPRESSION

<table>
<thead>
<tr>
<th></th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immunosuppressive Therapy at Specific Intervals - Australian Grafts 1996-2006</td>
<td>95-97</td>
</tr>
</tbody>
</table>
APPENDIX III - NEW ZEALAND

CONTENTS

NEW PATIENTS
- Number of New Patients in each Age Group - 1965-2006
- Number of New Patients by Racial Origin - 2002-2006
- Primary Renal Disease of New Patients - 2001-2006
- Gender, Primary Renal Disease and Age of New Patients - 2004-2006
- Racial Origin and Primary Renal Disease of New Patients - 1993-2006

DIALYSIS
- Age and Treatment of Dialysis Patients - 2001-2006
- Age and Treatment of Dialysis Patients by Gender - 2004-2006
- Race, Primary Renal Disease and Age of Dialysis Patients - 31st December 2006

TRANSPLANTATION
- Gender, Race and Age of Functioning Transplants - Resident Country - 2004-2006
- Functioning Transplants by Race, Primary Renal Disease and Age - 31st December 2006
- Donor Source and Recipient Age for Transplant Operations - 2002-2006
- Race, Primary Renal Disease and Age of New Transplanted Patients - 1994-2006
- Cause of Graft Loss - 1996-2006
- Year of Graft Loss due to Death or Failure - 1996-2006
- Year of Graft Loss due to Death or Failure - Age Related - 1996-2006

DEATHS
- Death and Mode of Treatment - 2001-2006
- Cause of Deaths - Haemodialysis, Peritoneal Dialysis and Transplant - 2006
- Site and Type of Infection Causing Death - 2006
- Cause of all Deaths by Gender, Race and Age - Female - 2006
- Cause of all Deaths by Gender, Race and Age - Male - 2006
- Cause of Dialysis Death by Gender and Race - 1994-2006
- Cause of Transplant Death by Gender and Race - 1994-2006
- Treatment Withdrawal Related to Treatment Mode, Disease, Gender and Age - 2004-2006

COMORBIDITY
- Number of Cohort Factors at Entry - 2006
- Cohort Conditions at Entry - 2006
- Race and Age of New Cohort Diabetic / Non Diabetic Patients - 2006
- Race of Cohort Diabetic/Non Diabetic Patients - Each Year - 1995-2006
- Cohort Conditions at Entry - Non Diabetic Primary Renal Disease Patients - 2002-2006
- Cohort Conditions at Entry - Diabetic Primary Renal Disease Patients - 2002-2006
- Cohort Conditions at Entry - All Patients - Each Year - 1995-2006
- Cohort Conditions at Entry - Caucasoid Patients - Each Year - 1995-2006
- Cohort Conditions at Entry - Maori Patients - Each Year - 1995-2006
- Cohort Conditions at Entry - Pacific People Patients - Each Year - 1995-2006
- Cohort Conditions at Entry - Haemodialysis as First Treatment - 2006
- Cohort Conditions at Entry - Peritoneal Dialysis as First Treatment - 2006

PATIENT DATA - TRANSPLANT AND DIALYSIS AS AT 31ST DECEMBER 2006
- Currently Functioning Transplant - Transplant Functioning >21 years
- Uninterrupted Dialysis for >9 years
- Longest Surviving Patients >16 years (Previously transplanted) Dialysis Dependent December 2006

HAEMODIALYSIS ANALYSIS RELATED TO AGE GROUPS
- Number of Treatments Per Week
- Blood Flow Rate (mls/ min)
- Hours of Treatment Per Week

IMMUNOSUPPRESSION
- Immunosuppressive Therapy at Specific Intervals - New Zealand Graft 1996-2006

Page 4
The ANZDATA Registry is pleased to present its 2007 Annual Report. It is the 30th annual report and covers data collected until the end of the calendar year 2006. Once again there has been an ongoing commitment from Renal Units in Australia and New Zealand, which has provided us with a report which we are confident contains 100% of patients who have received dialysis and transplantation services in Australia and New Zealand in this time period. The staff of the Registry once again would like to thank the commitment of these Renal Units and the hard work of their staff in the timely and accurate provision of data.

Our data collection process has continued to evolve, with an increasing emphasis on “real-time” data collection, either by fax or web-based processes. This spreads the data entry burden throughout the year, and collects information about key events (new patients, transplants, graft failure and death). We have developed an interface to allow units to interrogate the database regarding these entries, allowing immediate access to “real-time” data.

In 2007, Lee Excell has continued in her role as Manager of the Registry and Co-editor of the report. Brian Livingston has continued to provide information technology expertise and data analysis and Carol Young and Christina Leitch have provided administrative support.

Dr Stephen McDonald has continued in his role as Executive Officer of the Registry. His scientific and epidemiological leadership has ensured that the output from the Registry has maintained its usual high standard and attracted recognition both nationally and internationally. Dr McDonald has been an invited speaker to present registry data at a number of International Nephrology conferences in 2007, continuing a process of increasing the profile of the Registry.

There have been some changes to the staffing of the Registry over the last year. Hannah Dent has filled the role of biostatistician part-time sharing this role with the University of Adelaide. Lis Steinmetz is having two years long service leave and has been replaced by Christina Leitch.

Dr Sean Chang was appointed as Fellow in Epidemiology at the beginning of 2006. This position is funded by AMGEN and continues a most productive association which has provided the Registry with an excellent resource which we hope will continue well into the future.

Dr Emmanuel Villar from France has spent the past twelve months as a visiting postdoctoral fellow. He has had a particular interest in dialysis rates and outcomes associated with diabetes.

One of the strengths of the Registry can be measured by the number of publications which have appeared in peer review journals based substantially on data from ANZDATA. These publications are listed on Page 19 of the report. A further measure of these is the citation of individual papers; by this measure there has been a steady improvement overall.

The major funding for the Registry continues to come from the Australian Commonwealth Department of Health and Ageing. Funds are also provided from Kidney Health Australia and the New Zealand Ministry of Health. Non-tied grants have been received from AMGEN Australia for the employment of the Fellow in Epidemiology. Novartis Pharmaceuticals Australia Pty Ltd, Janssen-Cilag Pty Ltd, Roche Products Pty Ltd, and Wyeth Australia Pty Ltd have also generously provided non-tied grants for the maintenance of the web-based data entry system.

This report is the product of the hard work of a number of individuals and committees. The ANZDATA Registry Executive and the ANZDATA Registry Steering Committee Membership are listed on Page 7. The Working Groups which deal with specialty areas have also continued to generate ideas for data collection and data analysis.

Most of all though, we are indebted for the time and effort put in by the contributing units and their staff have enabled the Registry to stay at the forefront of end stage renal failure registries on the world scene.

Graeme Russ
Chair ANZDATA Executive
December 2007
ANZDATA Registry Executive Committee

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

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A/Professor Steven Chadban—Chair
Professor Graeme Russ
Dr Stephen McDonald
Mrs Leonie Excell
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Dr Ian Dittmer (New Zealand Representative)
Dr Scott Campbell (Project Manager—Transplantation)
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Haemodialysis Working Group
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Dr Kevan Polkinghorne
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 deidentified data only. On occasion, when data identifying particular hospitals is involved, consent from the Director of the relevant 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.
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 6704. You may also write to us (ANZDATA Registry, C/- The Queen Elizabeth Hospital, 28 Woodville Road SA 5011) 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 (i.e. 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

- **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. 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.

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. An extensive cross-sectional survey is then performed twelve monthly (for data to 31st December).

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

3. **Inclusion criteria**
Included in the Registry are all patients 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 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 definition has changed for this report. We now use data from the Tissue Typing Laboratories, cross-checked with ANZDATA. Waiting list analyses are for patients’ status at 31st December 2006.

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].

\[ C_l Cr = \frac{(140-\text{age}) \times \text{weight}}{(814 \times \text{Cr}_{\text{serum}})} \times 0.85 \text{ if female} \]

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
\[
\text{Kt/V} = 0.023 \times \text{PRU} - 0.284 \text{ (note that PRU = percent reduction in urea and not URR).}
\]

9.6 **Body mass index**
Body mass index (BMI) is calculated as \( \frac{\text{weight (kg)}}{(\text{height (m)})^2} \)
The standard NH&MRC categories are used: 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 31\(^{st}\) December 2006.

10.3 **Population denominator**
The population estimates used are the estimated resident populations (ERP) for the year 2006, 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.
Patient survival for transplant recipients - rates for fixed periods are calculated according to the life-table method and 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 (ie 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 grafted during that period. Patients are followed up until they are either grafted (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 continuous ambulatory peritoneal dialysis. Excluded are patients who had peritonitis before commencing peritoneal dialysis.

10.7 **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.

10.8 **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.

11. **Database**

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

12. **Statistics**

Statistical analyses were performed using SPSS release version 15 and Stata version 10.

13. **References**


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 and have on-site nephrology presence).

In contrast, satellite units (see Page 17) provide haemodialysis treatments to selected patients, usually with lower staff ratios and no on-site nephrologist.

QUEENSLAND
Allamanda Private Hospital (Nephrocare)
Bundaberg Base Hospital
Cairns Base Hospital
Chermside Dialysis Unit (Nephrocare)
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 Unit (Gambro)
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
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
Macleay Dialysis Centre
Mater Misericordiae Hospital
Mayo Private Hospital - Tarce
Port Macquarie Community Dialysis
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
Westmead Hospital
Orange Base Hospital
Wentworth Dialysis Centre

VICTORIA
Alfred Hospital
Austin Health
Epworth Hospital
Forest Hill Dialysis Centre (Nephrocare)
Geelong Hospital
Kew Private Dialysis Centre
Malvern Dialysis Centre (Nephrocare)
Monash Medical Centre – Adult
Monash Medical Centre – Paediatric
North West Dialysis Service
Royal Melbourne Hospital
Royal Children’s Hospital
St. Vincent’s Hospital

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
Middlemore Hospital
Palmerston North Hospital
Taranaki Base Hospital
Waikato Hospital
Wellington Hospital
Whangarei Area Hospital

AUSTRALIAN CAPITAL TERRITORY (ACT)
The Canberra Hospital
QUEENSLAND

Queensland Renal Transplantation Service
Princess Alexandra Hospital (Adult and Paediatric)
Director of Transplantation - Dr David Nicol
Ipswich Road
Woollongabba 4102

NEW SOUTH WALES

John Hunter Hospital
Director of Transplantation - Professor Adrian Hibberd
Lookout Road
New Lambton Heights
Newcastle 2304

Prince of Wales Hospital
Director - Professor John Charlesworth
Barker Street
Randwick 2031

Royal North Shore Hospital
Director - Dr David Waugh
Pacific Highway
St Leonards 2065

Statewide Renal Services (Royal Prince Alfred Hospital)
Director of Transplantation - A/ Professor Steven Chadban
Missenden Road
Camperdown 2050

St. George Hospital
Director of Transplantation - Professor John Kelly
Montgomery Street
Kogarah 2217

St. Vincent’s Hospital
Director - Dr Tim Furlong
Victoria Street
Darlinghurst 2010

Sydney Children’s Hospital
Director - Dr Andrew Rosenberg
C/- Department of Nephrology
Prince of Wales Hospital
Barker Street
Randwick 2031

The Children’s Hospital at Westmead
Director - Dr Elisabeth Hodson
Cnr Hawkesbury and Hainsworth Street
Westmead 2145

Westmead Hospital
Director - Professor Jeremy Chapman
Cnr Hawkesbury and Darcy Road
Westmead 2145

VICTORIA

Alfred Hospital
Director - Professor Napier Thomson
Commercial Road
Prahran 3181

Austin Health
Director - Dr David Power
Burgundy Road
Heidelberg 3084

Monash Medical Centre (Paediatric)
Director - Dr Amanda Walker
246 Clayton Road
Clayton 3165

VICTORIA (CONTINUED)

Monash Medical Centre (Adult)
Director - A/Professor Peter Kerr
246 Clayton Road
Clayton 3165

Royal Children’s Hospital
Director - Dr Colin Jones
Flemington Road
Parkville 3052

Royal Melbourne Hospital
Director - Professor Gavin Becker
Parkville 3052

St. Vincent’s Hospital
Director - Professor Robyn Langham
41 Victoria Parade
Fitzroy 3065

SOUTH AUSTRALIA

The Queen Elizabeth Hospital
Director - Professor Graeme Russ
28 Woodville Road
Woodville 5011

Women’s and Children’s Hospital
Director - Dr Paul Hennig
72 King William Road
North Adelaide 5006

WESTERN AUSTRALIA

Princess Margaret Hospital for Children
Director - Dr Ian Hewitt
Roberts Road
Subiaco 6008

Royal Perth Hospital
Director - Dr Kevin Warr
Wellington Street
Perth 6001

Sir Charles Gairdner Hospital
Director - Dr Harry Moody
Verdun Street
Nedlands 6009

NEW ZEALAND

Auckland City Hospital
Director - Dr John Collins
Park Road
Grafton, Auckland

Christchurch Hospital
Director - Dr Kelvin Lynn
Riccarton Avenue
Christchurch

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 Satellite - Cairns Base Hospital
- Cairns Private Hospital 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
- Logan Satellite - Princess Alexandra Hospital
- Mt. Isa Satellite - Townsville Hospital
- Noosa Satellite - Sunshine Coast Health District
- 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 - Gold Coast Hospital
- Vincent Satellite - Townsville Hospital

### NEW SOUTH WALES
- Armidale Satellite - Tamworth Hospital
- Ballina Satellite - Lismore Hospital
- Bankstown Hospital - South West Sydney Renal Services
- Bathurst Sturt Dialysis Centre - Orange Hospital
- Blacktown Satellite - Westmead Hospital
- Bembrina Hospital
- Broken Hill Hospital
- Campbelltown Satellite - South West Sydney Renal Services
- Cobar Hospital
- Coffs Harbour Base Hospital
- Coonamble Hospital
- Dame Edith Walker Satellite - Statewide Renal Services
- Dubbo Base Hospital
- Eora Satellite - Prince of Wales Hospital
- Gosford Satellite - Gosford Hospital
- Goulburn Satellite (Fresenius) - Statewide Renal Services
- Grafton Hospital - Lismore Hospital
- Griffith Base Satellite - Statewide Renal Services
- Innarell Satellite - Tamworth Hospital
- Lakehaven Satellite - Gosford Hospital
- Lanceley Cottage - Royal North Shore Hospital
- Lindfield Dialysis Unit (Gambro)
- Liverpool Community Centre - South West Sydney Renal Services
- Macleay Dialysis Centre - Kempsey
- Maitland Hospital - Hunter New England Health
- Moree Satellite - Tamworth Hospital
- Moruya Satellite (Fresenius) - Statewide Renal Services
- Muswellbrook - Hunter New England Health
- Norfolk Island Hospital - Statewide Renal Services
- Orange Base Hospital - Westmead Hospital
- Shellharbour - Wollongong Hospital
- Shoalhaven Satellite (Novara) - Wollongong Hospital
- Singleton Satellite - Hunter New England Health
- Taree Community Dialysis - Hunter New England Health
- Wagga Wagga Base Hospital
- Warney Satellite - Hunter New England Health
- Wellington 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
- Bacchus Marsh Hospital
- Balmoral Hospital
- Ballarat Health Services
- Bendigo Hospital
- Broadmeadows Satellite
- Brunswick Satellite
- Casey Satellite
- Casterton Hospital
- Caufield General Medical Centre
- Coburg Satellite
- Cohuna Hospital
- Colac Hospital
- Corryong Satellite
- Cranbourne Satellite
- Dandenong Satellite
- Daysclford Hospital
- Donald Hospital
- Echuca Hospital
- Edenhope Hospital
- Epping Dialysis Unit
- Frankston Satellite
- Gembro - Diamond Valley Community Hospital
- Goulburn Valley Hospital
- Hamilton Hospital
- Hastings Hospital
- Heidelberg - Austin Health

### VICTORIA (CONTINUED)
- Honsham Satellite
- Kyneton Hospital
- La Trobe Regional Satellite
- Lome Hospital
- Mansfield District Hospital
- Maryborough District Health Service
- Mildura Hospital
- Moorabbin Satellite
- Myrtleford Hospital
- Newcomb Satellite
- North East Kidney Service - Austin Health
- Northern Hospital Satellite
- Omeo District Hospital
- Orbost Hospital
- Peter James Centre
- Portland District Health
- Rosebud Hospital
- Royal Park Home Dialysis Service — Royal Melbourne Hospital
- Sale Hospital
- Sandringham Satellite
- Seymour Hospital
- South Geelong Renal Unit - Geelong Hospital
- St. George’s Hospital
- Sunshine Satellite
- Swan Hill Hospital
- Terang Satellite
- Wangaratta Hospital
- Wannamambool Hospital
- Werribee Mercy Hospital
- Western Gippsland Hospital
- Williamsstown Satellite
- Wodonga Regional Health Service
- Wonthaggi Hospital
- Yarrawonga Hospital
- Yarram Hospital

### TASMANIA
- North West Renal Unit, Burnie - Launceston Hospital

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

### NORTHERN TERRITORY
- Bathurst Island Hospital - Royal Darwin Hospital
- Katherine Dialysis Unit - Royal Darwin Hospital
- Nightcliff Community Centre - Royal Darwin Hospital
- Palmerston Satellite - Royal Darwin Hospital
- Tennant Creek Hospital - Alice Springs Hospital

### WESTERN AUSTRALIA
- Armadale Satellite - Bunbury Satellite
- Geraldton Hospital
- John Holt Dialysis Unit - Albany
- Joondalup Satellite Unit
- Kalgoolie Dialysis Unit
- Kimberley Dialysis Centre - Royal Perth Hospital
- Melville Satellite
- Midland Private Dialysis Centre (Baxter)
- Peel Health Campus - Mandurah
- Pilbara Dialysis Unit [Port Hedland] - Royal Perth Hospital
- Royal Perth Rehabilitation Hospital - Royal Perth Hospital

### NEW ZEALAND
- Bay of Islands Hospital - Whangarei Hospital
- Carrington Satellite - Auckland City Hospital
- Greenlane Hospital - Auckland City Hospital
- Manukau Satellite - Middlemore Hospital
- Middlemore Satellite - Middlemore Hospital
- Porirua Satellite - Wellington Hospital
- Rolara 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 (2006) and during 2007 are listed below.

2006


3. McDonald SP, Russ GR. Recurrence of IgA Nephropathy Among Renal Allograft Recipients From Living Donors is Greater Among Those With Zero HLA Mismatches. Transplantation 82(6):759-62, 2006


2007


5. Lim WH, Chang SH, Coates PTH, McDonald SP: Parental Donors in Live-Donor Kidney Transplantation Affects Acute Rejection Rates and Glomerular Filtration Rates at 1 and 5 Years. Transplantation 84: 972-980, 2007


### Data Collection Form

**Aust. & NZ. Dialysis and Transplant Survey**

**ANZDATA Registry 2007 Report**

**This Section for All Patients Dialysed at Any Time During This Survey Period**

<table>
<thead>
<tr>
<th><strong>ART</strong></th>
<th><strong>PT</strong></th>
<th><strong>HD</strong></th>
<th><strong>Transplant</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**HAEMODIALYSIS**

- **Dialysis Machine**
- **Blood Flow**
- **Dialysate Flow**
- **Dialysate Temperature**
- **Heparin Use**
- **Whole Blood**

**Access in Use**

**Access to Patients on Haemodialysis at Any Time During This Survey Period**

<table>
<thead>
<tr>
<th><strong>Arteriovenous Fistula</strong></th>
<th><strong>Arteriovenous Graft</strong></th>
<th><strong>Venous Access</strong></th>
<th><strong>None</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**All Peritoneal Dialysis**

<table>
<thead>
<tr>
<th><strong>Peritoneal Access</strong></th>
<th><strong>Access Type</strong></th>
<th><strong>Common Route</strong></th>
<th><strong>Bowel Obstruction</strong></th>
<th><strong>Exudates</strong></th>
<th><strong>Other</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Current Graft**

<table>
<thead>
<tr>
<th><strong>Type of Graft</strong></th>
<th><strong>Site</strong></th>
<th><strong>HD</strong></th>
<th><strong>Transplant</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Monoclonal / Polyclonal Therapy (Record from 1978)**

<table>
<thead>
<tr>
<th><strong>Therapy</strong></th>
<th><strong>IgG</strong></th>
<th><strong>IgM</strong></th>
<th><strong>IgA</strong></th>
<th><strong>Other</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total Days Dry Dose**

<table>
<thead>
<tr>
<th><strong>Dry Dose</strong></th>
<th><strong>IgG</strong></th>
<th><strong>IgM</strong></th>
<th><strong>IgA</strong></th>
<th><strong>Other</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Cause of Death**

<table>
<thead>
<tr>
<th><strong>Cause</strong></th>
<th><strong>Hypertension</strong></th>
<th><strong>Diabetes</strong></th>
<th><strong>Cancer</strong></th>
<th><strong>Other</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
INSTRUCTIONS FOR DIALYSIS AND TRANSPLANT SURVEY COMPLIATION
PLEASE READ THE EXPLANATORY NOTES BEFORE BEGINNING TO FILL IN THE FORMS
Please complete the form using neat capitals

5 - RACIAL ORIGIN
1 Caucasian
2 Asian
3 African
4 Male
5 Female
6 Native American or Alaskan Native
7 Other (specify)
8 Hispanic/Latino
9 Male
10 Female
11 Other (specify)
12 Other (specify)

6 - PRIMARY RENAL DISEASE
Results of ANZDATA (Australasian Nephrology Database) Registry list associated with your renal disease/conditions should be entered in new column OTHER

130 Pre-eclampsia
131 Polycystic kidney disease
132 Nephrotic syndrome
133 Pyelonephritis
134 Interstitial nephritis
135 Amyloidosis
136 Tuberculosis
137 Sickle cell disease
138 Graft-versus-host disease (GVHD)
139 Bilateral nephronal disease
140 Other (specify)

7 - DATA COLLECTION FORM CODING

9 - ANZDATA Registry 2007 Report
10 PRIMARY RENAL DISEASE (cont.)
11 Other
12 Hypertension
13 Diabetes mellitus
14 Obstructive uropathy
15 Amyloidosis
16 Polycystic kidney disease
17 Other (specify)

8 - VASCULAR
180 In situ atherosclerosis
190 Coronary artery disease
200 Other (specify)

9 - INFECTION
210 Enteric bacterial
220 Gastrointestinal tract
230 Other (specify)

10 - INFECTION
240 Uremia
250 Intestinal
260 Other (specify)

11 - NEPHROTIC SYNDROME
270 Nephrotic syndrome
280 Other (specify)

12 - OTHER (specify)
290 Other (specify)

13 - OTHER (specify)
300 Other (specify)

14 - TECHNICAL
310 Radiographic
320 Other (specify)

15 - DRUG THERAPY
330 Consensus statement
340 Other (specify)

16 - MISC/UNKNOWN
350 Other (specify)

17 - OTHER (specify)
360 Other (specify)

18 - DATA COLLECTION FORM CODING

19 - TYPICAL DIALYSIS
190 Hemodialysis
191 Peritoneal Dialysis
192 Cadaveric kidney transplant
193 Other (specify)

20 - DRY WEIGHT
200 A or B
210 C or D
220 E or F
230 G or H

21 - UNCORRECTED CALCIUM
210 Normal
220 Low
230 High

22 - PHOSPHATE
220 Normal
230 Low
240 High

23 - HAEMOGLOBIN
230 Normal
240 Low
250 High

24 - URINE OR K/ V
240 A or B
250 C or D
260 E or F
270 G or H

25 - SOURCE OF DONOR KIDNEY
250 Living donor
260 Cadaveric kidney
270 Other (specify)

26 - TOTAL I Schaema (HOURS)
260 A or B
270 C or D
280 E or F
290 G or H

27 - 30 TO 40 P CLEANCE STUDIES
270 A
280 B
290 C
300 D
310 E
320 F
330 G
340 H

28 - 40 TO 50 P CLEANCE STUDIES
280 A
290 B
300 C
310 D
320 E
330 F
340 G
350 H

29 - 50 TO 60 P CLEANCE STUDIES
290 A
300 B
310 C
320 D
330 E
340 F
350 G
360 H

30 - 60 TO 70 P CLEANCE STUDIES
300 A
310 B
320 C
330 D
340 E
350 F
360 G
370 H

31 - 70 TO 80 P CLEANCE STUDIES
310 A
320 B
330 C
340 D
350 E
360 F
370 G
380 H

32 - 80 TO 90 P CLEANCE STUDIES
320 A
330 B
340 C
350 D
360 E
370 F
380 G
390 H

33 - 90 TO 100 P CLEANCE STUDIES
330 A
340 B
350 C
360 D
370 E
380 F
390 G
400 H

34 - 100 TO 110 P CLEANCE STUDIES
340 A
350 B
360 C
370 D
380 E
390 F
400 G
410 H

35 - 110 TO 120 P CLEANCE STUDIES
350 A
360 B
370 C
380 D
390 E
400 F
410 G
420 H

36 - 120 TO 130 P CLEANCE STUDIES
360 A
370 B
380 C
390 D
400 E
410 F
420 G
430 H

37 - 130 TO 140 P CLEANCE STUDIES
370 A
380 B
390 C
400 D
410 E
420 F
430 G
440 H

38 - 140 TO 150 P CLEANCE STUDIES
380 A
390 B
400 C
410 D
420 E
430 F
440 G
450 H

39 - 150 TO 160 P CLEANCE STUDIES
390 A
400 B
410 C
420 D
430 E
440 F
450 G
460 H

40 - 160 TO 170 P CLEANCE STUDIES
400 A
410 B
420 C
430 D
440 E
450 F
460 G
470 H

41 - REASON FOR TRANSFER
A CAPD to HD
B HD to CAPD

42 - SOURCE OF DONOR KIDNEY
1 Living
2 Cadaveric

43 - TOTAL DAILY DIALYSATE
A Urea
B Creatinine
C IRC
D Other (specify)

44 - RESIDUAL RENAL FUNCTION
1 Severely reduced
2 Reduced
3 Preserved
SUMMARY
KEY SUMMARY POINTS

AUSTRALIA

- There were 16,027 people (778 per million) receiving renal replacement therapy (RRT) at 31st December 2006. Of these, 6,845 (332 per million) had a functioning kidney transplant and 9,182 (446 per million) received dialysis treatment.

- 2,378 people commenced RRT in Australia in 2006 (115 per million). The incident rate varied from 339 per million population in the Northern Territory to 92 per million in Tasmania.

- The mean age at commencement was 60.7 years, the median 63.2 years and the age range 0.4 - 93.1 years.

- 32% of new patients had diabetic nephropathy attributed as their cause of end stage renal failure, 23% had glomerulonephritis and 15% hypertension.

- Of patients < 65 years of age and receiving dialysis treatment, 25% were on the active kidney transplantation waiting list. This proportion varied between 2% in the Northern Territory and 39% in the Australian Capital Territory. Only 4% of Aboriginal/Torres Strait Islander patients < 65 years were on the transplant waiting list.

- The death rate per 100 patient years was 14.8 for dialysis dependent patients (haemodialysis 14.8, peritoneal dialysis 14.9) and 2.0 for those with a functioning kidney transplant (deceased donor 2.5, live donor 1.1).

- Of the 1,322 deaths among dialysis dependent patients in 2006, 35% were due to cardiovascular causes, 33% to withdrawal from treatment, 10% to infection and 7% from malignancy.

- Of the 137 deaths among patients with kidney transplants, 32% were due to malignancy, 30% to cardiovascular causes and 15% to infection.

- There has been a 7% increase in the total number of prevalent dialysis patients from 8,620 in December 2005 to 9,182 in December 2006.

- There were 641 kidney transplant operations performed in 2006, a transplant rate of 31 per million population.

- Of these, 43% (274 grafts) were from live donors compared to 39% (246 grafts) in 2005. 27% of primary live donor operations were performed without the recipient receiving prior dialysis therapy.

- For primary deceased donor grafts performed in 2005-2006, the 12 month patient and graft survival rates were 95% and 90% respectively.

- The five year primary deceased donor recipient and graft survival for operations performed in 2001-2002 were 90% and 82% respectively.

- There were 6,845 functioning kidney transplants in Australia at 31st December 2006, a prevalence of 332 patients per million represents a 5% increase over 2005.
KEY SUMMARY POINTS

NEW ZEALAND

- There were 3,224 people (779 per million) receiving renal replacement therapy (RRT) at 31st December 2006. Of these, 1,253 (303 per million) had a functioning kidney transplant, and 1,971 (476 per million) received dialysis treatment.

- 484 people (117 per million) commenced RRT in 2006.

- The mean age at commencement was 57.0 years, the median age 58.8 years and the age range 0.4 - 89.7 years.

- Diabetic nephropathy accounted for 42% of new patients, glomerulonephritis 21% and hypertension 12%.

- Of patients < 65 years of age, 22% were on the active kidney transplantation waiting list. 22% of Maoris and 14% of Pacific People < 65 years of age were on the transplant waiting list.

- The death rate per 100 patient years was 17.2 for dialysis dependent patients (haemodialysis 15.0, peritoneal dialysis 20.8) and 2.5 for those with a functioning kidney transplant (deceased donor 3.3, live donor 0.9).

- Of the 330 deaths among dialysis dependent patients in 2006, 39% were due to cardiovascular causes, 27% to withdrawal from treatment, 15% to infection and 6% from malignancy.

- Of the 31 deaths among patients with a kidney transplant, 48% were due to malignancy, 32% to cardiovascular causes and 13% due to infection.

- The number of patients who were dialysis dependent at 31st December 2006 (1,971) was an increase of 5% over the previous year. 54% of all dialysis dependent patients were receiving home dialysis. 70% of these were on peritoneal dialysis.

- The reported haemoglobin and use of erythropoietic agents has reached a plateau after increasing over recent surveys.

- There were 90 kidney transplant operations performed in 2006, a rate of 22 per million population.

- The percentage of live donors in 2006 was 54% (49 grafts), compared to 49% (46 grafts) in 2005.

- For primary deceased donor grafts performed in 2005-2006, the 12 month patient and graft survival rates were 96% and 90% respectively.

- The five year primary deceased donor recipient and graft survival for operations performed in 2001-2002 were 84% and 77% respectively.

- The 1,253 functioning kidney transplants at 31st December 2006, a prevalence of 303 per million represents a 1% increase from 2005.
TRENDS IN KIDNEY DISEASE OVER TIME

This section is a new one, and represents a slight change in the format of the report, following comments from various sources. In particular, there appears a role for a brief, narrative-style summary of particular themes in relation to end-stage kidney disease in Australia and New Zealand that sits somewhere between the simple figures of the “summary points”, and the exhaustive detail of the chapters and appendices. To this end, while some of the material section is unique, some is drawn from other areas of the report.

In this first “trends” section, we have chosen to highlight changes in rates of incidence (of renal replacement therapy) and how these people are treated.

For both Australia and New Zealand, the incidence rates since the Registry commenced have increased steadily since commencement of renal replacement therapy (RRT=dialysis and transplantation). The number of new patients each year for both countries is illustrated in Figure 0.1.

Clearly, these numbers reflect in part changes in the population but examination of age-specific rates shows dramatic changes. These changes have not been constant across all age groups. As illustrated in Figure 0.2 for Australia, the rates among the youngest age groups have been constant for many years, with increases in successively older age groups over time. Initially, the 55-64 year age group increased from the mid 1970’s, then the 65-74 year age group in the late 1980’s, and the 75-84 year old age group in the mid 1990’s. There has also been an increase in the 85 and older age group, however the overall impact of this on the actual numbers of people requiring treatment is lesser, as the absolute rates are lower and the proportion of the population in this age group is substantially smaller than in younger age groups.
Associated closely with this change in rates has been a change in the types of kidney disease to which the end-stage kidney failure is attributed. In particular, the bulk of the increase has occurred in people with diabetic nephropathy and kidney disease related to hypertension and renovascular disease (Figure 0.3).

**Figure 0.3**

![Primary Renal Disease Among People Starting Renal Replacement Therapy Australia and New Zealand](image)

Note different y axis scales

Another major trend over the previous 20 years has been the rapid rise in the rates of kidney disease among indigenous people in both Australia and in New Zealand. There are a number of publications based on ANZDATA material which have already been released and which describe the patterns and trends (1-5); there is also a very substantial body of work about the likely reasons underlying the very high rates of earlier stages of kidney disease among Aboriginal Australians in particular. The differential rates between Aboriginal and non-Aboriginal people in Australia varies with age, and is illustrated in Figure 0.4.

**Figure 0.4**

![Relative Incidence Between Aboriginal and Non-Aboriginal People in Australia 2001 - 2006](image)
A predictable outcome of increasing rates of new patients starting RRT each year is an increase in the total number of patients receiving some form of RRT at any one time. The trends in this number are illustrated in Figure 0.5. It can be seen that there is a steady increase year on year, and that the greatest increase has been in patients receiving dialysis treatment rather than transplantation. Over the period since 1990, the number of people in Australia receiving RRT has increased by 5.9% per year, and in New Zealand by 6.9% per year. Over this time, the proportion of all people receiving RRT who had a functioning kidney transplant has steadily fallen in both countries. Provision and funding of appropriate RRT services for this growing group is clearly a major challenge for the health systems of both countries (6).

Patterns of treatment have also changed over time. The treatment modality in use at 90 days is a commonly accepted surrogate for the planned longer term method of dialysis, as it allows time for in the implementation of an appropriate long-term treatment strategy among people who present late with their kidney disease. As can be seen in Figure 0.6, there is a steady trend towards HD and away from PD over the past 15 years.
Although the success rates of kidney transplantation have been steadily improving over many years, the number of kidney transplants is a key limiting factor. The number of transplants performed from deceased kidney donors have been static for ten years; there has been an increasing number of kidneys from living donors, particularly living unrelated donors in very recent years. Nevertheless, it can be seen from Figure 0.7 that a lower proportion of people are actually reaching transplantation. This is not explained simply by the ageing of the patients entering renal replacement therapy – it is true even for the younger age groups in whom transplantation would be the usual option if available, such are the <40 year age group.

**Figure 0.7**

**Time to Transplantation by Age at Start of Dialysis**

Note that in the Kaplan-Meier graphs in Figure 0.7 the denominator is the population at that point in time - for example at five years approximately 75% of people still receiving RRT (either dialysis or transplantation) have received a transplant. People who have died (either before or after transplantation) or who have reached the end of their follow up are removed from follow up at the time of death or loss to follow up.

**References**