Sean Kennedy
Steve McTaggart
Stephen McDonald
Hannah Dent
Nancy Briggs
Kylie Hurst
This year, as well as providing a summary of current trends in the frequency and causes of ESKD, the paediatric report will focus on dialysis delivery and adequacy, technique survival and biochemical outcomes, as well as an overview of frequency, causes and treatment for children and adolescents with ESKD.

**INCIDENCE AND PREVALENCE OF ESKD IN CHILDREN AND ADOLESCENTS 1991 - 2010**

**GENERAL OVERVIEW**

As shown in Figure 11.1, there is no clear long term trend in the incidence of children and adolescents developing ESKD and being treated with renal replacement therapy, although there are fluctuations from year to year. Prevalent numbers of treated ESKD have gradually increased across all age groups reflecting improved survival through increased duration of ESKD (Figure 11.2).

**Figure 11.1**

Incidence of RRT - Age 0-19 Years

Australia

New Zealand

**Figure 11.2**

Prevalence of RRT - Age 0-19 Years

Australia

New Zealand
CAUSES OF ESKD IN CHILDREN AND ADOLESCENTS 2005 - 2010

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 reflux nephropathy is a common cause of ESKD in adolescents.

![Figure 11.3](Image)

Causes of End Stage Kidney Disease In Children and Adolescents 2005 - 2010
Australia and New Zealand

<table>
<thead>
<tr>
<th>Primary Renal Disease</th>
<th>Age Groups (Years)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-4</td>
<td>5-9</td>
</tr>
<tr>
<td>Glomerulonephritis</td>
<td>12 (18%)</td>
<td>14 (24%)</td>
</tr>
<tr>
<td>Familial Glomerulonephritis</td>
<td>1 (1%)</td>
<td>7 (4%)</td>
</tr>
<tr>
<td>Reflux Nephropathy</td>
<td>3 (5%)</td>
<td>3 (5%)</td>
</tr>
<tr>
<td>Polycystic Kidney Disease</td>
<td>6 (9%)</td>
<td>3 (5%)</td>
</tr>
<tr>
<td>Medullary Cystic Disease</td>
<td>1 (2%)</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>Posterior Urethral Valve</td>
<td>8 (12%)</td>
<td>6 (10%)</td>
</tr>
<tr>
<td>Haemolytic Uræmic Syndrome</td>
<td>8 (12%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Hypoplasia / Dysplasia</td>
<td>18 (27%)</td>
<td>12 (20%)</td>
</tr>
<tr>
<td>Cortical Necrosis</td>
<td>1 (2%)</td>
<td>3 (5%)</td>
</tr>
<tr>
<td>Interstitial Nephritis</td>
<td>1 (1%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td>Cystinosis</td>
<td>2 (3%)</td>
<td></td>
</tr>
<tr>
<td>Uncertain</td>
<td>1 (2%)</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Miscellaneous / Other</td>
<td>9 (14%)</td>
<td>13 (22%)</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>59</td>
</tr>
</tbody>
</table>

MODALITY OF TREATMENT 2005 - 2010

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 18% of children and adolescents receive pre-emptive kidney transplants. Of the remainder, 42% commence renal replacement therapy with haemodialysis compared with 40% starting with peritoneal dialysis.

![Figure 11.4](Image)

Modality of Initial Renal Replacement Therapy By Year of First Treatment - Australia and New Zealand

<table>
<thead>
<tr>
<th>Current Treatment</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemodialysis</td>
<td>23 (43%)</td>
<td>23 (45%)</td>
<td>25 (42%)</td>
<td>35 (46%)</td>
<td>24 (38%)</td>
<td>23 (39%)</td>
<td>153 (42%)</td>
</tr>
<tr>
<td>Peritoneal Dialysis</td>
<td>18 (33%)</td>
<td>18 (35%)</td>
<td>26 (43%)</td>
<td>29 (38%)</td>
<td>30 (47%)</td>
<td>25 (42%)</td>
<td>146 (40%)</td>
</tr>
<tr>
<td>Transplant</td>
<td>13 (24%)</td>
<td>10 (20%)</td>
<td>9 (15%)</td>
<td>12 (16%)</td>
<td>10 (16%)</td>
<td>11 (19%)</td>
<td>65 (18%)</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>51</td>
<td>60</td>
<td>76</td>
<td>64</td>
<td>59</td>
<td>364</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>Current Treatment</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haemodialysis</td>
<td>46 (12%)</td>
<td>43 (11%)</td>
<td>44 (12%)</td>
<td>49 (12%)</td>
<td>52 (12%)</td>
<td>56 (13%)</td>
<td>290 (12%)</td>
</tr>
<tr>
<td>Peritoneal Dialysis</td>
<td>44 (12%)</td>
<td>45 (12%)</td>
<td>61 (16%)</td>
<td>69 (17%)</td>
<td>72 (17%)</td>
<td>62 (15%)</td>
<td>353 (15%)</td>
</tr>
<tr>
<td>Transplant</td>
<td>282 (76%)</td>
<td>291 (77%)</td>
<td>277 (73%)</td>
<td>292 (71%)</td>
<td>298 (71%)</td>
<td>300 (72%)</td>
<td>1740 (73%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>372</td>
<td>379</td>
<td>382</td>
<td>410</td>
<td>422</td>
<td>418</td>
<td>2383</td>
</tr>
</tbody>
</table>

**DIALYSIS DELIVERY AND ADEQUACY**

Figure 11.6 and 11.7 summarize the recent trends in HD practice among Paediatric patients.

**Figure 11.6**

Mean Sessions per Week Among Haemodialysis Patients
By Survey Period (95% CI)

**Figure 11.7**

Mean Hours per Session Among Haemodialysis Patients
By Survey Period (95% CI)
**DIALYSIS DELIVERY AND ADEQUACY**

**HAEMOGLOBIN**

Various dialysis process indicators are summarized in Figures 11.8 - 11.15. For all of these graphs, the box indicates the 25th, 50th, and 75th centiles. The "Whiskers" indicate the 95th centiles for each category.

**Figure 11.8**

Haemoglobin, December 2006-2010

Australia

**Figure 11.9**

Haemoglobin, December 2006-2010

New Zealand

**UREA REDUCTION RATIO (HD PATIENTS)**

**Kt/V (PD PATIENTS)**

**Figure 11.10**

Urea Reduction Ratio (HD Patients)

December 2006-2010

Australia

**Figure 11.11**

Kt/V (PD Patients)

December 2006-2010

Australia

Kt/V > 4 excluded as non-physiological.

Kt/V > 4 excluded as non-physiological.
BIOCHEMICAL OUTCOMES

SERUM CALCIUM

Figure 11.12
Serum Calcium, December 2006-2010
Australia

Figure 11.13
Serum Calcium, December 2006-2010
New Zealand

SERUM PHOSPHATE

For HD patients, Serum Phosphate is reported from a pre-dialysis specimen of a mid-week session.

Figure 11.14
Serum Phosphate, December 2006-2010
Australia

Figure 11.15
Serum Phosphate, December 2006-2010
New Zealand
VASCULAR ACCESS

AT FIRST TREATMENT

Vascular access for haemodialysis is summarized in Figures 11.16 -11.19.

**Figure 11.16**
Vascular Access at First Treatment
Australia

**Figure 11.17**
Vascular Access at First Treatment
New Zealand

**PREVALENT HAEMODIALYSIS ACCESS**

**Figure 11.18**
Prevalent Haemodialysis Access
Australia

**Figure 11.19**
Prevalent Haemodialysis Access
New Zealand
PD Technique Survival by Age Category

PD technique survival, censored for transplantation, loss to follow-up and recovery of renal function is presented below. The numbers available for analysis after the first year drop significantly in each age group in both countries, due to transplantation. Of the 170 patients, 41 (24%) received a transplant within one year of commencement of RRT. By two years a total of 73 (43%) of patients had received transplants.

Use of PD solutions is shown in Figure 11.22.

**Figure 11.20**

PD Technique Survival by Age Category  
Australian Paediatric Patients 2004-2010

**Figure 11.21**

PD Technique Survival by Age Category  
New Zealand Paediatric Patients 2004-2010

**Figure 11.22**

Use of PD Solutions 2007 - 2010

<table>
<thead>
<tr>
<th>Solutions</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-9</td>
<td>0-19</td>
<td></td>
<td></td>
<td>0-9</td>
<td>0-19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glucose</td>
<td>(n = 44)</td>
<td>(n = 50)</td>
<td>(n = 55)</td>
<td>(n = 48)</td>
<td>(n = 17)</td>
<td>(n = 19)</td>
<td>(n = 17)</td>
<td>(n = 14)</td>
</tr>
<tr>
<td>Icodextrin</td>
<td>43 (98%)</td>
<td>47 (94%)</td>
<td>54 (98%)</td>
<td>38 (79%)</td>
<td>16 (94%)</td>
<td>18 (95%)</td>
<td>16 (94%)</td>
<td>14 (100%)</td>
</tr>
<tr>
<td>Low GDP Lactate</td>
<td>8 (18%)</td>
<td>6 (12%)</td>
<td>11 (20%)</td>
<td>4 (8%)</td>
<td>1 (6%)</td>
<td>3 (16%)</td>
<td>3 (18%)</td>
<td>1 (7%)</td>
</tr>
<tr>
<td>Low GDP Bicarbonate</td>
<td>0 (0%)</td>
<td>2 (4%)</td>
<td>2 (4%)</td>
<td>10 (21%)</td>
<td>6 (35%)</td>
<td>2 (11%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>4 (9%)</td>
<td>1 (2%)</td>
<td>11 (20%)</td>
<td>18 (38%)</td>
<td>5 (29%)</td>
<td>15 (79%)</td>
<td>12 (71%)</td>
<td>8 (57%)</td>
</tr>
</tbody>
</table>