Renal Service Plan
for the Midland Region

Part Two
Recommendations – Options and Opportunities

Prepared by: Jan Barber,
Midland Regional Service Planner

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Acknowledgements:

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- Dr Maggie Fisher, Clinical Director Renal Services, Waikato DHB
- Jan Hewitt, Manager Medical Services, Waikato DHB
- Graham Borland, Operations Manager Renal Services, Waikato DHB
- Nicky Hagan, Clinical Nurse Specialist, Renal Services, Waikato DHB

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The five District Health Boards that comprise the Midland group are Bay of Plenty, Lakes, Tairawhiti, Taranaki, and Waikato.
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1. **EXECUTIVE SUMMARY AND RECOMMENDATIONS**

The Midland DHB CEO group has determined renal services should be planned at a regional level. This plan takes the recommendations from the Regional Renal Service Plan 2003 and determines options for implementation for each recommendation. The Regional Renal Satellite Haemodialysis Plan also forms a component of the recommendations for the service. These three documents support the Midland DHBs in planning renal services in order to meet the needs of the population.

The Regional Renal Centre currently provides renal services to the Bay of Plenty, Lakes, Tairawhiti and Waikato DHB populations. This is based on a ‘hub and spoke’ approach, with some services centralised e.g. inpatient beds, incentre dialysis and dialysis training. The recommendations for the Regional Renal Centre are made to strengthen this approach and to enable the service to meet the increasing renal services needs for this population. Taranaki renal services are managed independently from within Taranaki DHB.

Internationally there is a growth in the prevalence of End Stage Renal Disease (ESRD). There is also a corresponding growth in the rate of renal replacement therapy (RRT) as the acceptance rate for treatment increases – more patients are offered treatment, including older patients; patients survive longer on dialysis; and the increase in ESRF patients is significantly higher than demographic growth. The ageing population, the growth in of Māori and Pacific people and the rising rates in diabetes, hypertension and obesity will be significant contributors to the growth of ESRD in the Midland region.

To manage the services needed to treat the increasing number of patients in the region, it is critical that there is a planned approach to: prevention, treatment services, workforce development and data management. The predicted volumes in this document are based on limited information on the growth rate of ESRD and should be revised on a regular basis, as better information becomes available. It is important that the DHBs work together on the implementation of this plan, as a regional approach is required to ensure a networked and coordinated renal service that will improve integration, coordination and continuum of care for patients across the region.

The proposed changes to the Renal Service are based on two premises; the first to ensure the service has the resource to provide the basics needs to the patients with ESRF; the second is to develop the service further to enable a service based on best practice.

Components of the basic service that must be addressed are:

- The growth in ESRF and increasing resources required to meet the need to change current practice;
- Development of a Chronic Renal Failure programme which will support primary care to identify at risk patients and delay or prevent the onset of ESRF;
- Appropriate workforce resources, in particular nephrologist and allied health staffing levels and ensuring training needs are met for future requirements;
- Information management systems to enhance patient care by improved data management, communication, audit, efficiency, and decrease health related adverse events.

The development of satellite haemodialysis units across the region will be critical to manage the move to a greater proportion of patients using haemodialysis, and support patients being treated closer to home. This will also help to decrease some of the pressure on the incentre facility in the short term.

The move from CAPD to haemodialysis is recognised as best practice but will have significant cost implications for each DHB. While there are some cost offsets due to an anticipated decrease in inpatient events, the capital cost for haemodialysis machines and facilities is significant and the cost of service delivery for assisted haemodialysis is believed to be double that of CAPD and home haemodialysis and will result in an approximate cost increase of 40% for dialysis services based on current volumes and contract prices, to be incurred over the next seven years as this change is implemented.

This plan is based on international and New Zealand guidelines for best practice. It is acknowledged that implementation of the plan will be undertaken with local factors taken into consideration. It is also recognised that implementation will be dependent on the funding available.
RECOMMENDATIONS

Current Needs

1. **CHANGING PRACTICE**

The growth in ESRF and the need to ensure the best outcome for patients is driving a change in current practice for the renal service. This includes a move from CAPD to a greater proportion of patients having access to haemodialysis, however there is a significant funding increase required to enable the change to occur. The increase includes both cost of service delivery as well as capital costs for facilities and machines.

1.1. Agreement should be reached that each DHB is prepared to fund the recommended CAPD: haemodialysis ratio of 30:70. The increase is estimated at 40% of total dialysis costs based on current volumes and contract prices and excluding capital costs to be incurred over a seven year period. A full cost analysis has not been undertaken.

1.2. The incentre haemodialysis centre is running at capacity and the option for expanding this service will need to be addressed alongside the development of satellite haemodialysis units.

2. **WORKFORCE**

2.1. Nephrologist staffing is currently 1 FTE below the recommended level, with one specialist on a one-year contract. The predicted nephrologist requirements based on the expected growth in ESRF indicate that 6.6FTE will be required in 2006 and as there is significant time required to recruit specialist staff, this issue should be addressed urgently.

2.2. The appointment of a MOSS or interventional nephrologist would allow one individual to have primary responsibility for management of patient dialysis access sites. This position would support the renal service and decrease demand on radiologist and surgical services by the renal service and ensure development of expertise in this critical area of patient care.

2.3. Specific allied health positions that should be addressed urgently are those of dietician and social worker. The current staffing levels are inadequate to meet the needs of the existing service. An additional 3.6 FTE social workers and 1.8 FTE dieticians are required to bring the numbers up to recommended levels.

3. **CHRONIC RENAL FAILURE PROGRAMME**

Without intervention to slow the onset or prevent the development of ESRF the number of patients needing dialysis or transplant is likely to grow at a level that will become increasingly difficult to manage. It is essential that primary care understand which patients are at risk of developing chronic renal failure and can intervene in a timely fashion to delay or prevent further kidney damage.

3.1. Priority must be given to the resources required to develop a Chronic Renal Failure programme for implementation at a primary care level. Resources required include educator resource (1 FTE for 12 months, then review resource required), staff development – internal and primary care; resource material, and information systems to support transfer of information.

4. **INFORMATION MANAGEMENT**

One of the major frustrations for the renal team is that information relating to patient treatment modality and data reports (e.g. to ANZDATA) are managed manually. This not only inefficient and frustrating but allows only point of time information, rather than trends and is liable to error. Patient care will be enhanced though information management that improves data management, communication, audit, efficiency, and decreases health-related adverse events.

4.1. The Renal team, together with Waikato DHB Information Management staff, should develop a business case to support the development of a database that will allow analysis of patient flow and the services. This database should allow incorporation into DHB systems across the region, and the ability to link with primary care systems, in time.

4.2. A Data Analyst should be appointed to the renal service at Waikato DHB to input and analyse data as required and support the quality and audit requirements of the service.
Service Development

5. **PATIENT FOCUS**

The renal service must ensure support for patients through the continuum of care. Currently this focus is primarily during treatment. Additional support for patients is required at all stages of renal disease: during the early stages as renal failure is developing, support through a multidisciplinary team during treatment, and appropriate end of life care.

5.1. There is growing understanding internationally that Clinical Psychologist resource should be available to provide support to patients who have an identified mental health need as a consequence of renal problems and treatments. Recommendations are for 0.9-1 FTE to be available for the current renal replacement therapy patients.

5.2. Patients that develop end stage renal failure have a shortened life expectancy and a decreased quality of life. Good palliative care for patients depends on the understanding of the needs of the dying and their carers. Links with palliative care services across the regions must be strengthened be developed to ensure appropriate end of life care is provided to all patients who withdraw from therapy.

5.3. Members of the renal team should all attend a basic teaching session on the general principles of palliative care and at least one renal nurse, nominated by the renal team, should be supported by the relevant DHB to undertake postgraduate or masters level qualification in palliative care.

5.4. Transport and accommodation are critical components of a renal service and while not addressed specifically in this service plan, concerns that arise should be addressed by each DHB.

5.5. Development of a simple patient questionnaire is proposed to ensure that patients are aware and have opportunity to input into the renal service plans.

6. **WORKFORCE**

There is growth in renal disease internationally resulting in a worldwide recognition of staff shortages, therefore workforce planning for staff at all levels is essential to manage the forecast growth for this service. Consideration should be given to increasing resources to support the renal service and decrease the impact on other services and resources.

6.1. To meet the rapidly growing needs of the renal services it is critical that staffing levels are appropriate to deliver a safe and effective renal service that meets the needs of the patients. The significant timeframe required to attract clinical staff and train nursing staff means there is an imperative to address staffing requirements now and into the future in line with the levels recommended in Table 25 in this paper.

6.2. The impact of increasing renal patients on the radiology department and staff, in particular at Waikato Hospital, should be noted. The specific requirements for the service have not been identified within this plan but the impact of the growth of renal services must be taken into consideration in the long and short term planning of the radiology service.

6.3. The appointment of an Anaemia Management Nurse will enable the most clinically and cost effective combination of anaemia interventions, and ensure equitable access for all patients. This position should ensure that erythropoetin expenditure is managed cost-effectively.

6.4. Occupational Therapist resource is needed within each DHB region, to provide resource for patient assessment within the pre-dialysis programme to support the appropriate choice of treatment modality for patients.

6.5. Support should be provided for appropriate nursing staff to undertake relevant qualifications to gain nursing practitioner qualification, with prescribing rights where appropriate.

6.6. A Regional CAPD Liaison Nurse should be appointed to the outreach CAPD service, in a complementary role to the proposed Regional Satellite Haemodialysis Liaison Nurse role.
Renal transplantation is the preferred treatment option for ESRF patients who meet the national transplant waiting list criteria. The number of patients accepted for transplantation is expected to grow as the national changes to organ donation are established. The Midland DHBs can support this process through ensuring that local iwi understand and, where appropriate, support transplantation for their whānau.

7.1. To enable this the Midland DHB’s should establish a reference group of health professionals, Māori and non-Māori, and transplant recipients from across the districts, to understand the considerations for Māori and individual iwi in relation to organ transplantation and determine whether a full consultation process is required, and if so, the framework of any consultation.

7.2. Support for all patients on the renal transplantation waiting list, during work-up and following transplantation is through renal transplant coordinators. The role has the potential to support the nephrologists through better follow-up and management of patients. This support is limited at present due to current workload, which is predicted to grow significantly as ESRF patient numbers and transplant patient numbers grow. The current workload requires an additional 0.5 FTE for an efficient service.

8. REGIONAL SERVICE MODEL

To support the hub and spoke model of delivery it is important that the hub can ensure equity of access to all renal patients across the Midland region. The following recommendations are made to strengthen this model and allow provision of a true regional service:

8.1. That the Waikato renal service is renamed the Midland Region Renal Service.

8.2. That regional clinical leadership for renal services is provided through a Director or Coordinator of renal services who has responsibility for the development of renal services across the continuum of care within the Midland region (excluding Taranaki).

8.3. All staff, including CAPD staff, employed to provide services to renal patients across the region, should have formal links to the ‘hub’ service and must be recognised as a part of the regional service. These links should be through employment agreements, policies and procedures, continuing education and communication processes, including relationships with liaison staff and consultants.

8.4. That each DHB should provide the Waikato renal team Operations Manager with an updated waiting list each month, together with a list of the number of patients seen at a FSA or a subsequent attendance during the previous month.

9. SYSTEMS

9.1. The renal contract should include all national Purchase Units available for supporting a full renal service.

9.2. That FSA and Subsequent Attendance volumes should be negotiated to ensure that the appropriate total volume is contracted for each DHB. That the site of delivery of those volumes will be dependent on the resource available and the principles of service delivery should be taken into consideration.

9.3. That the FSA: subsequent attendance ratio should aim to reach 1: 12 when appropriate resources are available.
2. **Background**

The Waikato Renal Service is contracted to provide a regional renal service for adults to the population of four of the Midland DHBs, Waikato, Bay of Plenty, Lakes and Tairawhiti. Taranaki has employed a nephrologist and independently manages renal services for the Taranaki population. Paediatric renal services are provided by Starship Hospital in Auckland. Waikato provides transplantation patient work-up, coordination for the transplant and all follow-up services for Midland patients undergoing renal transplant surgery at Auckland Hospital.

Multidisciplinary care for renal services has been a key component in the management and treatment of end stage renal failure (ESRF). The challenge for the next phase of nephrology care is to prevent as many individuals as possible ever reaching ESRF. Based on the Australia and New Zealand Dialysis and Transplant Registry information (ANZDATA) there has been a 50% increase in the number of patients receiving renal replacement therapy (RRT) between 1997 and 2003 in the Midland region. Early detection and treatment of known factors that can lead to renal failure, either as a component of deteriorating renal failure per se, or chronic renal failure as a complication of another disease process, are well documented to halt or slow the progression to ESRF.

Of all those presenting to a nephrology service, a high proportion present for the first time within days or weeks of requiring dialysis. For many of these patients early referral for pre-dialysis management may have delayed or prevented further deterioration of renal function.

Additional background information on the renal service is provided in the Midland Region - Regional Renal Service Plan published in December 2003. The recommendations from this plan are included in Section 2.1.

### 2.1. Regional Renal Service Plan

The Waikato District Health Board, mandated by the Midland District Health Boards, (DHBs) commissioned a Regional Renal Service Plan in 2003. The aim was to produce a strategic blueprint that reflects the views and expectations of the region, best practice standards and outcomes for patients and to have a common and planned approach to the development of renal services for the Midland region.

The project objectives included:

- Determine current renal services available within the Midland region. Include service components, contractual arrangements, demographic data, operational service delivery, staff, and resource information;
- Identify issues and opportunities that give rise to alternative innovative service options and improvements;
- Wide consultation with stakeholders and key personnel from regional DHBs. Improved relationships – purchaser-provider, clinical, and provider-provider;
- Strategic direction and principles for a Regional Renal Service;
- Regional Renal Service Plan that recommends a collaborative approach to the future shape of Renal Services in the Midland Region.

The following are the recommendations identified in the Regional Renal Service Plan.

### 1. Identification and Management of Early Disease

Integrated clinical care pathways are developed with PHOs and other regional health professionals, defining roles and responsibilities, leading to detection, prevention, or management of early renal disease in the primary care setting.
Primary health care workers should have clear referral guidelines and be able to easily access an adequately staffed and resourced multidisciplinary specialist team. Integrated care plans with secondary health providers will lead to better management of chronic renal disease reducing cardiovascular risk factors and metabolic consequences of renal failure.

2. Provision of a High Quality Renal Replacement Programme

Establishment of Regional Satellite Dialysis Units
Patients require improved access to satellite haemodialysis units if they are to have full access to all dialysis modalities and achieve the best outcomes. These need to be developed according to national standards of best practice and within available resources.

A regional business case on the five-year development of satellite units should be developed jointly by the Midland DHBs following the National Renal Advisory Groups development of guidelines and standards for establishment of satellite units in New Zealand. The establishment of satellite units should be based on population demand.

This will require co-operative agreements on:

- Lines of responsibility and relationships with regional physicians and GPs;
- Service delivery model - access to nephrologists, vascular surgeons and interventional radiologists;
- Clinical referral pathways;
- Training and supervision of haemodialysis staff and ongoing maintenance of standards and professional development;
- Financial and contractual agreements;
- Technical agreements, with facility standards based on the Victorian guidelines for satellite dialysis units and international water quality and machine maintenance standards;
- Appropriate infection control measures.

There is strong regional support that the tertiary centre lead and manage the home training programmes.

Information Technology
An integrated regional ESRF prevention programme across the Midland region should be planned and delivered supported by an appropriate information management system that allows ongoing audit of procedures and outcomes according to national guidelines.

Transplantation
There needs to be increased education and promotion of organ donation across the Midland region with emphasis on Māori beliefs surrounding transplantation. The programme should include the promotion of live donation.

Intersectoral Integrated Clinical Pathways
Renal patients require the management and support of many different healthcare professionals and social service agencies throughout their lifetime.

To provide a high level of service to the patients and their families close co-operation between medical specialists needs to be developed i.e. with vascular and transplant surgeons, radiologist, diabetologists and cardiologists. Further links need to be formed with health providers in the community: - the PHOs, Older Persons services, the Institute of Rural Health, Māori health providers and population health services.

Social Support
There needs to be improved patient accommodation at the tertiary centre.
3. Workforce Planning

In view of the increasing demand for renal services there needs to be a long-term plan to identify future needs and expand the workforce and develop appropriately skilled staff. Nursing specialist roles in patient education and the management of chronic renal failure need to be developed. Dialysis nurse practitioner roles would be an important service development along with dialysis technicians.

Patients require the support of a strong multidisciplinary team with close working relationships between physicians, surgeons, specialist nurses, dieticians, pharmacists, and social agencies. This requires co-ordinated workforce planning and staff fully trained to meet the needs of the renal patients.

There is strong regional support that the tertiary centre would lead education and development of the health workforce.

Note: For the purpose of this document numbers quoted for the Midland Regional Renal service exclude the Taranaki population.
3. CURRENT SITUATION AND ISSUES

3.1. Demographics

Predictions based on New Zealand Statistics 2001 census data show that the population of the Midland DHBs, as a group, is increasing, although there are decreases in the Taranaki and Tairawhiti populations. Bay of Plenty has the highest rate of growth of the Midland DHBs. Midland DHB Population and predicted changes are shown in Figure 1.

The ethnic make-up of the DHB populations varies as shown in Figure 2. This impacts on the rate of renal disease within each DHB, as Māori and Pacific people have higher rates of ESRF compared with the European population. See Table 1.
Table 1. Dialysis by Ethnicity, 2002 (ANZDATA)

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Waikato</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Māori</td>
<td>56.78%</td>
<td>32.45%</td>
</tr>
<tr>
<td>European</td>
<td>38.14%</td>
<td>46.82%</td>
</tr>
<tr>
<td>Pacific Peoples</td>
<td>3.95%</td>
<td>14.38%</td>
</tr>
<tr>
<td>Asian</td>
<td>1.13%</td>
<td>6.09%</td>
</tr>
<tr>
<td>Other</td>
<td>0.00%</td>
<td>0.26%</td>
</tr>
</tbody>
</table>

It should be noted that ANZDATA is classified under the treating renal centre i.e. Waikato data includes Bay of Plenty, Lakes, Tairawhiti and Waikato renal patient information.

Table 2 shows the age and gender of patients receiving dialysis. The increasing age of the population will impact on the incidence and prevalence of this disease in the community as greater numbers of older people are treated and survival rates improve for patients receiving dialysis.

Table 2. Age and Gender of Patients Receiving Dialysis, 2003 (ANZDATA)

<table>
<thead>
<tr>
<th></th>
<th>Waikato</th>
<th>New Zealand</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gender</td>
<td>#</td>
<td>%</td>
</tr>
<tr>
<td><strong>Haemodialysis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>45</td>
<td>44.1%</td>
<td>335</td>
</tr>
<tr>
<td>Male</td>
<td>57</td>
<td>55.9%</td>
<td>579</td>
</tr>
<tr>
<td>Total</td>
<td>102</td>
<td>100%</td>
<td>914</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-14</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
</tr>
<tr>
<td>15-24</td>
<td>11</td>
<td>4.9%</td>
<td>40</td>
</tr>
<tr>
<td>25-54</td>
<td>81</td>
<td>31.6%</td>
<td>362</td>
</tr>
<tr>
<td>55-74</td>
<td>143</td>
<td>55.9%</td>
<td>591</td>
</tr>
<tr>
<td>75+</td>
<td>19</td>
<td>7.42%</td>
<td>111</td>
</tr>
<tr>
<td>Total</td>
<td>256</td>
<td>100%</td>
<td>1127</td>
</tr>
</tbody>
</table>

|                   | Gender  | #   | %    | #   | %    | #   | %    |
|-------------------|---------|     |     |     |     |     |     |
| Female            | 120     | 44.9%| 524  | 46.5%| 1468 | 46.5%|
| Male              | 147     | 55.1%| 603  | 53.5%| 1690 | 53.5%|
| Total             | 267     | 100%| 1127 | 100% | 3158 | 100% |
| **Peritoneal Dialysis** |   |     |     |     |     |     |     |
| 0-14              | 2       | 0.8% | 32   | 2.8% | 69   | 2.2% |
| 15-24             | 11      | 4.3% | 31   | 2.8% | 89   | 2.8% |
| 25-54             | 81      | 31.6%| 362  | 32.1%| 933  | 29.5%|
| 55-74             | 143     | 55.9%| 591  | 52.4%| 1569 | 49.7%|
| 75+               | 19      | 7.42%| 111  | 9.9% | 498  | 15.8%|
| Total             | 256     | 100%| 1127 | 100% | 3158 | 100% |

Figure 3 shows that all DHBs have an increasing population in the over 65-year age group, with the proportion of Māori in this age group also predicted to increase. This is an important consideration in the planning of renal services.

Table 3 identifies the domicile DHB of the patients receiving dialysis through the Midland Regional Renal Centre as at 31 July 2004. These numbers provide a point of time view of the patient numbers across the region but do fluctuate as patients become acutely unwell, change treatment modality or cease active treatment.
Figure 3. Predicted Population over 65 years by Ethnicity

Table 3. Midland Region Renal Dialysis Patients as at 31 July 2004

<table>
<thead>
<tr>
<th>DHB</th>
<th>PD Home</th>
<th>Home Haemodialysis</th>
<th>Permanent Incentre Haemodialysis</th>
<th>Acute Incentre Haemodialysis</th>
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<td>Waikato</td>
<td>101</td>
<td>31</td>
<td>28</td>
<td>9</td>
<td>169</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>20</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>Lakes</td>
<td>29</td>
<td>13</td>
<td>4</td>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>Bay of Plenty</td>
<td>54</td>
<td>17</td>
<td>10</td>
<td>5</td>
<td>86</td>
</tr>
<tr>
<td>Total</td>
<td>204</td>
<td>63</td>
<td>42</td>
<td>18</td>
<td>327</td>
</tr>
</tbody>
</table>

3.1.1. INTERNATIONAL RENAL DATA COMPARISONS

The United States Renal Data System (USRDS)\(^3\) provides comparisons of ESRF in many countries including New Zealand and Australia. The website information indicates:

- That the incidence rate of ESRF is increasing steadily around the world with the United States and Japan having the highest incident rates per million population (pmp) – 336 (313) and 252 (234) in 2001 (1998 figures are shown in brackets) respectively. The incidence rates in New Zealand and Australia in 2001 were 137 (98) and 119 (86) pmp respectively. See Figure 3.

- The prevalence of ESRF is also rising as the incidence increases and the patients live longer with ESRF. See Figure 4.

- Peritoneal dialysis is used by more than half of the patients in New Zealand, and approximately one-third in Australia and Canada. It is far less common in the United States and is used in less than 5% of ESRF patients in Japan. See Figure 5.

- The rate of home haemodialysis use around the world has declined with the US having one of the lowest rates in 2001 (<1%), while approximately 11% of Australian patients and 14% New Zealand patients use home haemodialysis. See Figure 5.

- The percent of patients for whom diabetes is the cause of ESRF is highest in Brunei, New Zealand and the United States, and lowest in Russia and Hungary.
The number of first transplants is between 30 and 50 pmp in most countries. New Zealand 30 pmp and Australia 31 pmp in 2002.

Figure 4. Incidence of ESRF 2001 per million population (USRDS)

Figure 5. Prevalence Rates ESRF Patients per Million Population (USRDS)

Figure 6. Dialysis by Type, 2001 (USRDS)
Figure 6 shows the rates of treatment modalities in different countries around the world. The main determinants for modality choice are informed patient choice, absence of medical and surgical contraindications, and resource availability. Many countries are reviewing options of moving to increase both the number of patients treated with peritoneal dialysis, and the rate of home dialysis.

It should be noted that in some countries, funding to physicians varies dependent on the treatment modalities used. This may lead to perverse incentives for putting patients on the treatment where funding is greatest. It is difficult to be sure that the comparisons are identifying ‘like’ statistics. However, it is obvious that the growth of end stage renal failure patients is growing throughout the world with no country showing a plateau.

There is also a corresponding growth in the rates of renal replacement therapy (RRT) as the acceptance rate for treatment increases – more patients are offered treatment, including older patients; patients survive longer on dialysis; and the increase in ESRF patients is significantly higher than demographic growth.

3.1.2. NEW ZEALAND SITUATION

The number of patients receiving dialysis in New Zealand and the Midland region over the period 1997 – 2003 is shown in Figure 7. In the Midland region dialysis patient numbers increased by 79% and 67% in New Zealand as a whole, during this period.

The corresponding number of patients with functional renal transplants (Figure 7) is relatively static in comparison to the growth in dialysis patients, although the numbers have increased more recently as shown in Table 4. Modelling of future renal dialysis requirements in Australia has identified that increasing the transplant rate from 23 pmp in 1998 to 47 pmp by 2007 the direct cost saving would be $82 million (1998 Australian dollars).

The 2002 rate of transplantation for Midland is 10 pmp while New Zealand as a whole was 30 pmp. The Midland rate has increased to over 20 pmp in 2003 and 25 pmp in 2004 (See Table 4). The reason for the low rate for Midland is due to the high proportion of patients who do not meet transplantation criteria due to co-morbidities such as obesity or cardiovascular risk. (See Appendix 3 for the New Zealand waiting list criteria for renal transplantation.) For all New Zealand patients receiving dialysis approximately 25% of patients meet transplant criteria, whereas for Midland the proportion is between 15 and 20%.
Figure 8. Number of Patients with a Functioning Renal Transplant in New Zealand 1997 – 2003

Table 4. Renal Transplants - Midland Patients 2001 - 2004

<table>
<thead>
<tr>
<th>Year</th>
<th>#</th>
<th>pmp</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>2002</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>2003</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>2004*</td>
<td>17</td>
<td>25</td>
</tr>
</tbody>
</table>

*Extrapolated to full-year

Cause of End Stage Renal Disease

The incidence of New Zealand ESRF patients with diabetes as the primary cause has increased from 39% in 1999 to 45% in 2002. See Figure 9. The proportion in the Midland population is around 50% and this has remained constant over this time.

New Zealand has put significant resource into diabetes treatment and management over the last few years. An approach to Sandy Dawson, Chief Clinical Advisor at the Ministry of Health indicates “a wild guess is that feasible diabetes improvements might reduce ESRF by 20% at most.” Serum creatinine is included in the annual blood tests for Get Checked, and ACE Inhibitor uptake in people with microalbuminuria is one of the Clinical Performance Indicators for Primary Health Organisations (PHOs), as these provide opportunities to identify the development of renal failure in the diabetic population. It is thought that it may take 2 - 5 years to notice the difference in ESRF, and 10 years to get to close to maximum effect.

Table 5. New Zealand Diabetes Get Checked Results for Percent of People with Diabetes on an ACE Inhibitor

<table>
<thead>
<tr>
<th></th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td>Māori</td>
<td>41%</td>
<td>52%</td>
<td>56%</td>
</tr>
<tr>
<td>Pacific People</td>
<td>43%</td>
<td>48%</td>
<td>51%</td>
</tr>
<tr>
<td>NZ European</td>
<td>36%</td>
<td>41%</td>
<td>43%</td>
</tr>
<tr>
<td>Other</td>
<td>34%</td>
<td>41%</td>
<td>43%</td>
</tr>
<tr>
<td>Not Stated</td>
<td>38%</td>
<td>42%</td>
<td>49%</td>
</tr>
<tr>
<td>Total</td>
<td>37%</td>
<td>46%</td>
<td>49%</td>
</tr>
</tbody>
</table>
The major opportunity to reduce renal failure in people with diabetes is management of hypertension and where there is microalbuminuria or identified renal disease this should be through the use of ACE inhibitors (or angiotensin II receptor blockers if ACE inhibitor’s not tolerated). The national results from the Get Checked programme indicating the percent of people with diabetes in Get Checked programmes and on ACE inhibitors are shown in Table 5. Unfortunately there are still relatively large numbers of diabetic patients, and specifically Māori, not enrolled in Get Checked programmes around New Zealand, including the Midland region.

Figure 9. Primary Diagnosis of all Dialysis Patients as at 2003 (ANZDATA)

Figure 9 shows the comparison of the primary diagnoses for all patients receiving dialysis in 2003 in the Midland region, with those in New Zealand as a whole, and with dialysis patients in Australia. It should be recognised that only one cause is identified per patient, many patients, when diagnosed with ESRF, have more than one co-morbidity.

Figure 10. Causes of End Stage Renal Failure in New Zealand
Figure 10 shows the primary diagnosis of End Stage Renal Failure patients in New Zealand between 1999 and 2002. The proportion of patients with diabetes as the cause of ESRF in the Midland region has remained constant over this period.

**Cause of Death**

Irrespective of the primary diagnosis, internationally the most common cause of death for ESRF patients is cardiac related, see Figure 11. The majority of social causes of death relate to withdrawal of treatment.

![Figure 11. Cause of Death in Dialysis and Transplant Dependent Patients in New Zealand 2002 (ANZDATA)](image)

The ANZDATA reports include the death rates for renal patients in New Zealand. The rate for diabetic patients is significantly higher than that of non-diabetics whether patients receive dialysis or have a renal transplant. See Table 6. Similar rates are also reported for Australian renal patients.

**Table 6. Death Rates for Dialysis and Transplant Patients in New Zealand 2002 (ANZDATA)**

<table>
<thead>
<tr>
<th>Renal Death Rates (per 100 patient years) 2002</th>
<th>Dialysis</th>
<th>Transplant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic</td>
<td>20.9</td>
<td>7.2</td>
</tr>
<tr>
<td>Non-diabetic</td>
<td>12</td>
<td>2.4</td>
</tr>
</tbody>
</table>

**3.2. Predicted Growth Rate of ESRF**

The worldwide increase in renal disease is predicted to continue as a result of increasing age, obesity, type 2 diabetes and hypertension. There has been no statistical analysis undertaken at a national level to determine the trends and predictions for ESRF incidence and prevalence in New Zealand. However, the New Zealand Public Health Intelligence Unit has published bulletins, Modelling Diabetes: Forecasts to 2011 and Nutrition and the Burden of Disease 1997 - 2011, which indicate increases in diabetes (incidence increase by 80% between 1996 and 2011) and obesity (BMI increasing 26.2 in 1997 - 27.5 in 2011), which will result in increasing number of patients with ESRD.

The Australian and New Zealand Dialysis and Transplant Registry (ANZDATA) collect and publish information from Australian and New Zealand Renal Services. This information is available on the ANZDATA website. The 2003 ANZDATA report indicates that in 2002 for the first time since 1993 there was a 3% decrease in the number of new patients commencing treatment in both Australia and New Zealand. This is reflected in the total RRT patient numbers in Midland and New Zealand data.
shown in Table 7. No specific reason has been identified for this decrease and it is difficult to know whether this is a one-off decrease or will continue.

The National Renal Workforce Group have predicted between 5% and 9.2% as the annual growth for New Zealand as a whole. Midland has a higher incidence of renal disease than New Zealand as a whole due to the high Māori population. Tairawhiti appears to have a much lower prevalence than would be expected when compared with other areas with similar proportion of Māori in the DHB population e.g. Eastern Bay of Plenty (See Table 8). This is thought to be due to under referral rather than a lower prevalence.

### Table 7. Renal Patients Numbers 1997 – 2003 (ANZDATA)

<table>
<thead>
<tr>
<th>Year</th>
<th>Dialysis Waikato</th>
<th>% Change per Annum</th>
<th>Dialysis New Zealand</th>
<th>% Change per Annum</th>
<th>Renal Replacement Therapy Waikato</th>
<th>% Change per Annum</th>
<th>Renal Replacement Therapy New Zealand</th>
<th>% Change per Annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>177</td>
<td>9.93%</td>
<td>993</td>
<td>10.27%</td>
<td>271</td>
<td>5.90%</td>
<td>1844</td>
<td>9.00%</td>
</tr>
<tr>
<td>1998</td>
<td>196</td>
<td>10.73%</td>
<td>1095</td>
<td>7.76%</td>
<td>287</td>
<td>8.00%</td>
<td>2146</td>
<td>6.80%</td>
</tr>
<tr>
<td>1999</td>
<td>212</td>
<td>8.16%</td>
<td>1180</td>
<td>10.59%</td>
<td>310</td>
<td>8.40%</td>
<td>2511</td>
<td>10.00%</td>
</tr>
<tr>
<td>2000</td>
<td>238</td>
<td>12.26%</td>
<td>1305</td>
<td>11.88%</td>
<td>336</td>
<td>13.70%</td>
<td>2848</td>
<td>6.90%</td>
</tr>
<tr>
<td>2001</td>
<td>280</td>
<td>17.65%</td>
<td>1460</td>
<td>8.63%</td>
<td>421</td>
<td>10.20%</td>
<td>2685</td>
<td>10.00%</td>
</tr>
<tr>
<td>2002</td>
<td>312</td>
<td>11.43%</td>
<td>1586</td>
<td>4.29%</td>
<td>436</td>
<td>3.60%</td>
<td>2699</td>
<td>0.50%</td>
</tr>
<tr>
<td>2003</td>
<td>317</td>
<td>1.60%</td>
<td>1645</td>
<td>10.31%</td>
<td>49.80%</td>
<td>6.30%</td>
<td>39.60%</td>
<td></td>
</tr>
</tbody>
</table>

% Increase 1997 – 2003: 61.84% 53.42% 49.80% 39.60%

Average Change per Annum: 10.31% 8.90% 8.30% 6.60%

### Table 8. Prevalence Dialysis Patients by DHB per Million Population

<table>
<thead>
<tr>
<th>Year</th>
<th>Eastern Bay of Plenty</th>
<th>Western Bay of Plenty</th>
<th>Lakes</th>
<th>Tairawhiti</th>
<th>Waikato</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>Eastern Bay of Plenty</td>
<td>816</td>
<td>310</td>
<td>387</td>
<td>394</td>
<td>346</td>
</tr>
<tr>
<td>2002</td>
<td>Eastern Bay of Plenty</td>
<td>735</td>
<td>348</td>
<td>523</td>
<td>430</td>
<td>403</td>
</tr>
<tr>
<td>2003</td>
<td>Eastern Bay of Plenty</td>
<td>816</td>
<td>500</td>
<td>523</td>
<td>467</td>
<td>413</td>
</tr>
</tbody>
</table>

### Table 9. Dialysis Modality Split (ANZDATA)

<table>
<thead>
<tr>
<th>Year</th>
<th>Waikato</th>
<th>Haemodialysis</th>
<th>CAPD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Home %</td>
<td>Incentre %</td>
</tr>
<tr>
<td>1996</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waikato</td>
<td>17.0</td>
<td>4.0</td>
<td>0.0</td>
</tr>
<tr>
<td>NZ</td>
<td>21.0</td>
<td>19.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Australia</td>
<td>13.0</td>
<td>28.4</td>
<td>27.1</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waikato</td>
<td>17.6</td>
<td>16.8</td>
<td>0.0</td>
</tr>
<tr>
<td>NZ</td>
<td>19.2</td>
<td>25.7</td>
<td>8.3</td>
</tr>
<tr>
<td>Australia</td>
<td>11.5</td>
<td>27.1</td>
<td>34.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2004 (as at Mar 04)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waikato</td>
<td>19.2</td>
<td>18.6</td>
<td>0.0</td>
</tr>
<tr>
<td>NZ</td>
<td>13.9</td>
<td>25.1</td>
<td>16.2</td>
</tr>
<tr>
<td>Australia</td>
<td>10.0</td>
<td>27.0</td>
<td>39.6</td>
</tr>
</tbody>
</table>
The high CAPD usage and lack of satellite haemodialysis units in the Midland region has significant influence on the NZ modality splits.

The percentage growth rate should be revised as better information becomes available. However, for the purpose of this report, the predicted ESRF rates used are a low growth rate of 10% and a high rate of 15% with a medium rate based on a growth rate of 10% for Western Bay of Plenty and Waikato and 15% for Eastern Bay of Plenty, Lakes and Tairawhiti (the areas with high percent of Māori in the population). See Table 10. This demonstrates a growth of between 97% and 169% over the period 2003 and 2011 and assumes the current death rate remains static.

Table 10. Predicted Number of Dialysis Patients for the Midland Region, 2003 - 2011

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Bay of Plenty</td>
<td>36</td>
<td>41</td>
<td>48</td>
<td>55</td>
<td>63</td>
<td>72</td>
<td>83</td>
</tr>
<tr>
<td>Lakes</td>
<td>50</td>
<td>55</td>
<td>61</td>
<td>67</td>
<td>73</td>
<td>81</td>
<td>89</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>22</td>
<td>25</td>
<td>29</td>
<td>33</td>
<td>38</td>
<td>44</td>
<td>51</td>
</tr>
<tr>
<td>Waikato</td>
<td>169</td>
<td>194</td>
<td>224</td>
<td>257</td>
<td>296</td>
<td>340</td>
<td>391</td>
</tr>
<tr>
<td>Midland Renal Centre</td>
<td>327</td>
<td>365</td>
<td>408</td>
<td>456</td>
<td>510</td>
<td>570</td>
<td>638</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Bay of Plenty</td>
<td>36</td>
<td>41</td>
<td>48</td>
<td>55</td>
<td>63</td>
<td>72</td>
<td>83</td>
</tr>
<tr>
<td>Lakes</td>
<td>50</td>
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<td>66</td>
<td>76</td>
<td>87</td>
<td>101</td>
<td>116</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>22</td>
<td>25</td>
<td>29</td>
<td>33</td>
<td>38</td>
<td>44</td>
<td>51</td>
</tr>
<tr>
<td>Waikato</td>
<td>169</td>
<td>194</td>
<td>224</td>
<td>257</td>
<td>296</td>
<td>340</td>
<td>391</td>
</tr>
<tr>
<td>Midland Renal Centre</td>
<td>327</td>
<td>365</td>
<td>408</td>
<td>456</td>
<td>510</td>
<td>570</td>
<td>638</td>
</tr>
</tbody>
</table>

The predicted number of patients, based on a medium growth rate, for each treatment modality, CAPD, home haemodialysis, incentre and satellite haemodialysis, and transplant are shown in Table 11. The predicted number of CAPD patients has been decreased by 10% per annum and haemodialysis increased by the equivalent number until approaching a 30:70 ratio in 2010. This is in line with the proposed move to increase the proportion of patients receiving haemodialysis as the dialysis treatment. Initially a ratio of 50:50 was proposed, however increasing evidence that for many patients outcomes are better on haemodialysis than CAPD has lead to a revision of the ratio and proposes that 30 CAPD: 70 haemodialysis may be more appropriate. It must be noted that due to the rural nature of the Midland region that this ratio may not be achievable.

The split between satellite and incentre patients will be dependent on the development of satellite haemodialysis centres across the region. A review of suitable patients in July 2004 identified that 12.5% may have been suitable for treatment in a satellite haemodialysis unit if there was one available. This is lower than the levels across New Zealand and Australia shown in Table 9 and may be due to the high number of patients with significant co-morbidities. For further information see the Regional Renal Satellite Haemodialysis Plan.

DHB’s must plan for this change in practice, as satellite and incentre haemodialysis are approximately twice the treatment cost of CAPD or home haemodialysis. However CAPD patients require more inpatient care than haemodialysis due to infections and peritonitis and some savings will be made. A full cost-analysis of the change in treatment modality has not been undertaken.
Table 11. Predicted Patient Numbers by Domicile and Treatment Modality, 2004 - 2011

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Eastern Bay of Plenty</td>
<td>24</td>
<td>25</td>
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<td>27</td>
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<td>29</td>
<td>30</td>
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</tr>
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<td>29</td>
<td>29</td>
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<td>28</td>
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<td>Lakes</td>
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<tr>
<td>Tairawhiti</td>
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<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
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<td>Waikato</td>
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<td>97</td>
<td>96</td>
<td>95</td>
<td>94</td>
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<tr>
<td><strong>Midland Renal Centre</strong></td>
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<td>207</td>
<td>209</td>
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<td>213</td>
<td>216</td>
<td>218</td>
</tr>
<tr>
<td>PD% of Total Dialysis</td>
<td>62.4%</td>
<td>69.9%</td>
<td>63.2%</td>
<td>57.2%</td>
<td>51.7%</td>
<td>46.8%</td>
<td>42.4%</td>
<td>38.3%</td>
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<td><strong>Home Haemodialysis</strong></td>
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<td>Western Bay of Plenty</td>
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<td>Lakes</td>
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<td>20</td>
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<td>26</td>
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<td>35</td>
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<tr>
<td>Tairawhiti</td>
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Assumptions:

- Growth rate for Waikato and Western Bay of Plenty at 10% per annum;
- Growth rate for Eastern Bay of Plenty, Lakes and Tairawhiti at 15% per annum;
- 10% move to haemodialysis each year to achieve 30 CAPD: 70 haemodialysis ratio;
- Increase in haemodialysis assumed equal across DHB regions – no clinical consideration of patient type included in predictions;
- Home haemodialysis remaining at approximately 20% of total dialysis;
- Transplant volumes increasing from current 25 pmp to 28 pmp, assuming increase in total NZ transplants undertaken. Note this is in addition to the predicted dialysis growth rate;
- Transplant death rate of 3% per annum
3.3. Contract Volumes

The national Purchase Units available for Renal Medicine are listed in Table 12. Table 13 shows the contract and actual volumes for each DHB.

Table 12. Renal Medicine Purchase Units

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<td>Number of Patients</td>
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<td>M60005</td>
<td>CAPD Training</td>
<td>New Clients</td>
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<td>M60006</td>
<td>Home-based Haemodialysis</td>
<td>Number of Patients (&gt;12 treatments/month)</td>
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<td>Incentre Self managed dialysis training</td>
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<td>M60011*</td>
<td>Pre-Renal Replacement Therapy program</td>
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<td>M60012*</td>
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* Not purchased

Table 13. Contract and Actual Volumes by DHB

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Note - Outpatient PUCs may include some paediatric outpatient volumes.
### Table 14. Total Volumes delivered by Patient Domicile & DHB

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<td>46</td>
<td>578</td>
<td>220</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>83</td>
</tr>
<tr>
<td>Western Bay of Plenty</td>
<td>27</td>
<td>26</td>
<td>252</td>
<td>123</td>
<td>5</td>
<td>16</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Bay of Plenty Total</td>
<td>166</td>
<td>95</td>
<td>1075</td>
<td>704</td>
<td>9</td>
<td>42</td>
<td>7</td>
<td>155</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>28</td>
<td>21</td>
<td>156</td>
<td>238</td>
<td>7</td>
<td>27</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Tairawhiti Total</td>
<td>28</td>
<td>21</td>
<td>156</td>
<td>238</td>
<td>7</td>
<td>27</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>3</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>764</td>
<td>396</td>
<td>3341</td>
<td>2831</td>
<td>66</td>
<td>351</td>
<td>26</td>
<td>651</td>
</tr>
</tbody>
</table>

Actual volumes for Waikato by domicile for M60004 and M60006 do not match actuals reported to the MoH. These are from two sources and reflect issues in the databases and accuracy of data entered.
The waiting lists for renal medicine are managed by the individual DHBs. This does mean that there is potential for inequity of access for patients across the region, as contract volumes do not reflect demand and during times of resource constraint there is no ability to prioritise across the region. The Nephrologist attending the outreach DHB is the only person on the renal team who may be aware of the waiting list and unless the trend is noted the appropriate people may not be notified until the issue becomes urgent. For appropriate regional management of the service each DHB should provide the Renal Operations Manager a monthly update with the FSA’s and follow-up numbers seen at each clinic during the previous month, together with the numbers in each category on the waiting list.

The long waiting times and the need to admit urgent referrals are due to growth in patient numbers and nephrologist and registrar resource constraints. The number of patients referred to the service has grown while the number of nephrologists has remained static since 1998. Registrar availability has been inconsistent with no registrar available for 3-4 months of 2003 and again in 2004. A fourth nephrologist appointed for a 12-month period, commenced at Waikato DHB in October 2004. At this time it is unknown whether this may become a longer-term appointment.

Table 15. Waikato DHB Renal Medicine Waiting Times as at 31 August 2004

<table>
<thead>
<tr>
<th>FSAs</th>
<th>Actual</th>
<th>Elective Services Access Criteria Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent</td>
<td>Admitted</td>
<td>Within 24 hours</td>
</tr>
<tr>
<td>Semi-urgent</td>
<td>2 - 12 weeks</td>
<td>Within 2 weeks</td>
</tr>
<tr>
<td>Routine</td>
<td>12 weeks – 7 months</td>
<td>Within 8 weeks</td>
</tr>
<tr>
<td>FSA waiting list</td>
<td>61 patients</td>
<td></td>
</tr>
</tbody>
</table>

Follow-ups

| To be seen > 6 months | 6-12 months |
| To be seen < 6 months | Waiting a further month to be seen |

Table 16. DHB Renal Medicine Waiting Times as at 30 September 2004

<table>
<thead>
<tr>
<th>DHB</th>
<th>Patients Waiting for an FSA</th>
<th>Number waiting &gt; six months</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Bay of Plenty</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Western Bay of Plenty</td>
<td>51</td>
<td>13</td>
<td>Option for additional clinics under discussion</td>
</tr>
<tr>
<td>Lakes</td>
<td>7</td>
<td></td>
<td>All patients seen within two months</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>24</td>
<td>11</td>
<td>Follow-ups seen within timeframes</td>
</tr>
</tbody>
</table>

The UK Royal College of Physicians recommend there should be 12 subsequent attendances for each first specialist assessment in Renal Medicine. This is the only recommended ratio available and the Renal Clinical Director believes this to be an appropriate ratio for New Zealand. For the Renal team to meet this service level not only would the contracted level of subsequent attendances have to increase substantially but also there would need to be an increase in staff numbers.

Table 17. First Specialist Assessment: Subsequent Attendance Ratios

<table>
<thead>
<tr>
<th>FSA: Follow-up Ratio</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract</td>
<td>1.7</td>
<td>1.6</td>
</tr>
<tr>
<td>Actual</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Recommended ratio</td>
<td>1:12</td>
<td></td>
</tr>
</tbody>
</table>

Table 18 indicates volumes recommended for each DHB to meet the demand for the local population.
Table 18. Predicted Volumes by DHB

<table>
<thead>
<tr>
<th></th>
<th>Actuals by Domicile DHB</th>
<th>Actual Contract Volumes</th>
<th>Predicted Volumes by Patient Domicile DHB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay of Plenty</td>
<td>166</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>Lakes</td>
<td>91</td>
<td>105</td>
<td>120</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>28</td>
<td>32</td>
<td>37</td>
</tr>
<tr>
<td>Waikato</td>
<td>473</td>
<td>459</td>
<td>520</td>
</tr>
<tr>
<td>MRRC Total</td>
<td>764</td>
<td>839</td>
<td>843</td>
</tr>
<tr>
<td>M60001 – Renal Medicine Inpatient DRG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bay of Plenty</td>
<td>95</td>
<td>58</td>
<td>106</td>
</tr>
<tr>
<td>Lakes</td>
<td>73</td>
<td>49</td>
<td>84</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>21</td>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td>Waikato</td>
<td>213</td>
<td>278</td>
<td>234</td>
</tr>
<tr>
<td>MRRC Total</td>
<td>402</td>
<td>415</td>
<td>449</td>
</tr>
<tr>
<td>M60002 – Renal Medicine First Specialist Attendance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bay of Plenty</td>
<td>1075</td>
<td>476</td>
<td>1277</td>
</tr>
<tr>
<td>Lakes</td>
<td>481</td>
<td>301</td>
<td>1007</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>156</td>
<td>145</td>
<td>290</td>
</tr>
<tr>
<td>Waikato</td>
<td>1771</td>
<td>2648</td>
<td>2812</td>
</tr>
<tr>
<td>MRRC Total</td>
<td>3483</td>
<td>3570</td>
<td>5386</td>
</tr>
<tr>
<td>M60003 – Renal Medicine Subsequent Attendance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bay of Plenty</td>
<td>719</td>
<td>744</td>
<td>656</td>
</tr>
<tr>
<td>Lakes</td>
<td>337</td>
<td>432</td>
<td>362</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>238</td>
<td>276</td>
<td>250</td>
</tr>
<tr>
<td>Waikato</td>
<td>1245</td>
<td>1179</td>
<td>1200</td>
</tr>
<tr>
<td>MRRC Total</td>
<td>2539</td>
<td>2631</td>
<td>2467</td>
</tr>
<tr>
<td>M60004 – Home-based CAPD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bay of Plenty</td>
<td>9</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Lakes</td>
<td>12</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>7</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Waikato</td>
<td>38</td>
<td>71</td>
<td>-</td>
</tr>
<tr>
<td>MRRC Total</td>
<td>66</td>
<td>71</td>
<td>64</td>
</tr>
<tr>
<td>M60005 – CAPD Training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bay of Plenty</td>
<td>198</td>
<td>190</td>
<td>229</td>
</tr>
<tr>
<td>Lakes</td>
<td>205</td>
<td>168</td>
<td>179</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>24</td>
<td>24</td>
<td>28</td>
</tr>
<tr>
<td>Waikato</td>
<td>356</td>
<td>469</td>
<td>409</td>
</tr>
<tr>
<td>MRRC Total</td>
<td>1127</td>
<td>851</td>
<td>845</td>
</tr>
<tr>
<td>M60006 – Home-based Haemodialysis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bay of Plenty</td>
<td>7</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Lakes</td>
<td>4</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>1</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Waikato</td>
<td>14</td>
<td>35</td>
<td>-</td>
</tr>
<tr>
<td>MRRC Total</td>
<td>26</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td>M60007 – Home Haemodialysis Training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bay of Plenty</td>
<td>168</td>
<td>266</td>
<td>180</td>
</tr>
<tr>
<td>Lakes</td>
<td>86</td>
<td>149</td>
<td>96</td>
</tr>
<tr>
<td>Tairawhiti</td>
<td>8</td>
<td>26</td>
<td>0</td>
</tr>
<tr>
<td>Waikato</td>
<td>443</td>
<td>622</td>
<td>444</td>
</tr>
<tr>
<td>MRRC Total</td>
<td>705</td>
<td>815</td>
<td>720</td>
</tr>
</tbody>
</table>
Assumptions:

- Volumes by patient domicile DHB not necessarily where service will be provided;
- Outpatient volumes based on 2003-04 actuals with 15% growth for Eastern Bay of Plenty, Lakes and Tairawhiti, and 10% growth for Western Bay of Plenty and Waikato;
- No substantial increase in referrals in Tairawhiti;
- Training volumes not split by domicile DHB due to small numbers and fluctuations in volumes;
- Ratio of 1:12 First Specialist Assessments to Subsequent Attendances;
- Dialysis volumes based on patient numbers predicted in Table 10 including a move to 30% CAPD and 70% haemodialysis.

There are a number of national purchase units not contracted by the Renal Service that would support the Renal Service to funding and deliver a full service. Waikato DHB should consider the option of funding M60009 and M60010 relating to self managed dialysis; and M60011 and M60012, which relate to funding for pre-dialysis and chronic renal failure programmes.

Recommendations

Agreement should be reached that each DHB is prepared to fund the recommended CAPD: Haemodialysis ratio of 30:70 The increase in dialysis funding is estimated at $6 million, approximately 40% of current contract price for all DHBs, based on current volumes and prices and excluding capital costs. Note that this increase is proposed to take place over 7 years.

Each DHB should provide the Waikato Renal Service Operations Manager with an updated waiting list each month together with a list of the number of patients seen at an FSA or at a subsequent attendance during the previous month.

Volumes should be negotiated to ensure that the appropriate total volume is contracted for each DHB. That the site of delivery of those volumes will be dependent on the resource available and the principles of service delivery (Section 4.1.2) should be taken into consideration.

FSA: subsequent attendance ratio should aim to reach 1:12 when appropriate resources are available.

The renal contract should include all national Purchase Units available for supporting a full renal service.

3.4. Summary of Current Situation and Issues

- The prevalence of ESRF continues to rise internationally;
- The predicted growth in Māori, Pacific peoples, increasing age of the population and the predicted increase in diabetes, hypertension and obesity are indicators that the prevalence of ESRF will continue to rise in the Midland population;
- The transplantation rate for the Midland population is likely to remain lower than New Zealand as a whole due to the high proportion of patients who do not meet transplantation criteria;
- The proportion of patients whose primary diagnosis for patients with ESRF in the Midland region is type II diabetes has remained constant, while this has increased in the New Zealand as a whole;
- Management of hypertension in diabetic patients will delay or prevent the onset of renal disease;
- The most common cause of death in renal patients is cardiac;
● Dialysis growth rates are predicted at 10% for Waikato and Western Bay of Plenty and 15% for Eastern Bay of Plenty, Lakes and Tairawhiti;

● Dialysis growth rate has decreased since 2002, if the rate increases or continues to decrease the predicted volumes will need to be recalculated as better information becomes available;

● Volumes are relatively small and fluctuations can have a large impact on predicted number of patients.

● Transplantation rates have increased and are anticipated to continue to rise gradually;

● Haemodialysis is be the preferred mode of dialysis for suitable patients;

● It is expected to take 7 years to achieve the proposed 30 CAPD: 70 haemodialysis ratio.

● The move from CAPD to assisted dialysis will have significant cost implications for DHBs.

● Current contract volumes do not meet the growth and recommended service levels;

● The service is regional but contract volumes and waiting lists are managed at an individual DHB level;

● Best practice services, such as pre-dialysis, are not currently supported through appropriate funding streams.
4. RENAL SERVICE

Renal medicine, or nephrology, includes the care of patients with all forms of renal disease, with or without impairment of renal function. The exceptions are patients with malignancy of the renal tract and other surgical conditions. The renal team also provides care for renal transplant patients both pre- and post transplantation.

Traditionally the renal service has managed patients once they have been referred for treatment of their ESRF. There is increasing evidence that early identification and treatment of chronic renal failure can slow and in some cases, stop or even reverse the deterioration of renal function. Patients at risk of developing ESRF can be identified and managed in primary care with appropriate protocols and guidelines. Early referral of patients, whose renal function is deteriorating, ideally 12 months prior to needing dialysis, allows the best opportunity for the optimum outcome for patient. Many patients are referred late, when the only treatment option is RRT through transplantation or dialysis.

The National Service Specification for Renal Services was published in March 2004 and is included in the Regional Renal Service Plan and available on www2.moh.govt.nz/nsfl. The New Zealand National Renal Advisory Board (NRAB) has developed an early draft of Standards and Audit for Dialysis intended as an appendix to the National Renal Service Specification. Acknowledgment is made to Grant Pidgeon, Chair of the NRAB for providing a copy of this draft document and agreeing to references being included in this service plan.

This document includes recommendations on: access to dialysis, workforce recommendations, vascular access, peritoneal dialysis, and technical standards. Some of these recommendations are included in Appendix Three.

The Australian Medical Workforce Advisory Committee published Sustainable Specialist Services: A Compendium of Requirements in 1998. This report includes recommendations for a specialist nephrology service relating to population and infrastructure. The relevant tables are attached as Appendix Six. It should be noted this document is in the process of being updated with an expected completion date of November 2004 but was not available at the time this document was completed.

The proposed renal service is described in Section 4.1 with diagrammatic representation shown in Figure 12.

4.1. Integrated Clinical Pathways

The national renal service specification includes an objective for renal services to have available services that provide continuum of care from pre-hospital services including general practitioners, nurse practitioners and other community providers to hospital medical, surgical and intensive care services.

In 1997 the UK Renal Association recommended that joint clinics between nephrologists and other specialists would be of benefit in managing an individual’s care collaboratively. While this has been shown to be of value, the benefits are often restricted to hospital inpatients or those who have already been referred to a nephrologist. Clinics e.g. diabetic, cardiovascular and renal held on the same day at the same facility may provide advantages to patients in the outreach areas who have to travel to attend a clinic. A focus on prevention through an integrated care approach is more likely to have the added advantage of early intervention.

Traditionally in the UK and in New Zealand renal services have been provided on a “hub and spoke” model. This has been based on the contractual relationships rather than the emphasis on clinical care and requires strengthening to ensure the service continues to develop as a patient focussed regional service. Retaining the hub and spoke approach across the DHB areas is important, while moving to strengthen a clinical network model of care is believed to enhance patient care and support shared care arrangements with primary care.
INTEGRATED RENAL SERVICE

Unplanned or emergency presentation

Referral to/from primary care

Referral from another specialty (e.g. cardiology, endocrinology)

Nephrology assessment and review at First Specialist Assessment or as an inpatient

Pre-renal replacement therapy programme

Renal replacement therapy treatment choices

Peritoneal access surgery

Vascular access surgery

Pre-emptive transplant

Peritoneal dialysis

Haemodialysis

Transplant

Failing transplant

End of life care

Patient needs
- Early diagnosis and management of CRF.
- Early referral of ESRF.
- Understanding of implications of ESRF, use of medicines and treatments.
- Individual care plan.
- Ability to recognise and act on symptoms.
- A contact person within the renal team.
- How to access social supports including employment, leisure activity & psychological.
- Patient Support Group

Referral guidelines
- Patient specific information, including care plan
- Access to renal MD team members

Chronic Renal Failure Management Programme

GP information needs
- Chronic renal failure management guidelines
- Diabetic renal care guidelines
- Dialysis information & guidelines for care.
- Transplant patient care
- Referral guidelines
- Patient specific information, including care plan
- Access to renal MD team members

Chronic Renal Failure Management Programme

Renal team
- Sufficient staff to provide a high quality service including:
  - Consultant staff
  - Trained renal nurses for inpatients, outpatient clinics, dialysis units, community
  - Nurse practitioners/CNS
  - Renal dietician, social workers, pharmacist.
  - Dialysis machine technicians.

Resources including:
- Dialysis machines
- Facilities
- Information management
- Continuing Education

Linkages to:
- Transplant service.
- Paediatric renal service.
- Antenatal renal service.
- Other specialties, surgery, diabetes, cardiology.
- Primary care.
- Community services.
- Palliative & hospice services.
- Other renal networks

Adapted from UK NSF – care pathway for renal replacement therapy
Integrated clinical pathways developed with Primary Health Organisations (PHOs) and other regional health professionals leading to detection and management of early renal disease in the primary care setting will have the maximum benefits for patients. Prevention of renal disease also has strong links with prevention, early detection and treatment of diabetes and cardiovascular disease.

The UK NHS defines Managed Clinical Networks as ‘linked groups of health professionals and organisations from primary, secondary and tertiary care, working in a co-ordinated manner, unconstrained by existing professional and Health Trust boundaries, to ensure equitable provision of high quality clinically effective services’.

Components of a renal service network as shown in Figure 12, include:

Access to:
- Transplantation services, including preparation of all aspects of live & cadaver transplantation, surgery, biopsy, pathology services. May be outside of the network geographical area;
- Specialist renal services e.g. paediatric, ante-natal;
- Specialist investigations e.g. clinical trials, new treatments e.g. monoclonal immunotherapy.

Delivery of:
- Outpatient clinics – FSA and follow-ups;
- Inpatient treatment and investigation;
- Unit-based haemodialysis services within easy travelling time of the patients’ home, unless geographical and economic considerations dictate otherwise (UK RA recommend 90% patients should have access to satellite dialysis unit within 30 mins travelling time);
- Home-based haemodialysis services and support;
- Continuous ambulatory peritoneal dialysis (CAPD) and automated peritoneal dialysis (APD) and support;
- Transplantation work-up, follow-up and live donor assessments;
- Inpatient acute renal failure services
- Social work, counselling, occupational therapy, physiotherapy, dietetics and clinical & dispensing pharmacy services;
- Renal technical support;
- Renal nursing – inpatient, outpatient and dialysis. (Bonent exam or other relevant qualification);
- Undergraduate medical training, renal medicine training of house officers and registrars;
- Clinical research and audit;
- Administrative support and infrastructure, including information technology links across the network, database management.

Working relationship with:
- Acute medicine services at each DHB
  - Management of emergency transfers for new and current renal patients
  - Medical support of inpatients admitted for non-renal conditions preferably through a physician with an interest in nephrology.
- Other medical speciality services
  - Diabetes
  - Cardiology
  - Services for older persons
- Community and primary care providers
  - Primary Health Organisations
  - Community providers including kaupapa Māori Health providers
- Institute of Rural Health
  - Surgical services
  - For timely vascular access and peritoneal access
  - Urological assessment of some patients;
  - Radiology
  - Diagnostic and interventional radiology services
  - Pathology
  - Renal biopsy and cytology services
  - Biochemistry, haematology, immunology and microbiology.
  - Palliative care
  - Conservative management of renal failure and withdrawal of treatment
  - Access to psychiatric and / or psychology services
  - Schools of Medicine for both undergraduate and postgraduate training.
  - Ambulance and transport services.
  - Formal links with all DHBs and providers

Core Principles:
- Clarity about management arrangements;
  - Including a leader – may be a clinician or clinical manager;
  - Patient representation at a management level
- Defined structure establishing points of service delivery and connections between these;
- Clear statement of specific clinical and service improvements expected from network;
- Evidence-based guidelines available to all and updated through research and development;
- Multi-disciplinary approach with clarity of the role of each health professional;
- Clear policy on dissemination of information to patients and the nature of that information;
- Quality assurance programme acceptable to an appropriate Clinical Standards Body;
- Education and training potential should be utilised to the full though exchanges between those working in the community and primary care and those working in hospital or specialist centres.
- All health professionals must actively participate in audit and open review of results;
- Professional development programmes for all staff within the network, including support for any patient representative.

Advantages
- Provision of more integrated holistic renal care;
- More flexible in addressing service issues / problems;
- Increased opportunity for multidisciplinary education and training initiatives;
- Agreement of service priorities;
- Consistency in clinical and operational standards.

4.1.1. M IDLAND REGIONAL RENAL CENTRE OPPORTUNITIES

Opportunities to strengthen the Midland Regional Renal service integrated clinical network include:
- Developing information technology links across DHBs and providers;
- Strengthening the relationships with:
  - Community and primary care providers in the development of a chronic renal failure management programme and providing a multidisciplinary supportive relationship;
- Palliative care providers to ensure that the end of life care for renal patients is managed as a component of the continuum of care;
- Institute of Rural Health to support the delivery of services through rural providers for patients in rural areas;
- Schools of Medicine to support the growing training needs for medical staff in renal medicine; and to ensure that there is an understanding of kidney function by all medical practitioners.

- Ensuring the principles identified are in place, including:
  - Clinical leadership for the region;
  - Formal linkages for staff in all DHB’s to the hub through employment contracts, liaison staff, and continuing education;
  - Communication networks between staff within the service; and across the regions DHBs.

4.1.2. SERVICE DELIVERY PRINCIPLES

The establishment of renal services has occurred over time on a relatively ad hoc basis. The recommendations here are to strengthen the development of the accepted ‘hub and spoke’ model of for renal services delivery for the Regional Renal Centre and the regions DHBs. As the need for staff to be based in the outreach centres grows, this model also provides for conjoint staff appointments, continuing education, research, and practice databases. The principles below also support the integrated Clinical Network approach.

In determining options for the delivery of a regional service, DHB’s should consider the following principles:

- Solo specialists are not recommended by AMWAC, however should a solo specialist be employed, their needs must be considered in relation to reasonable hours of work, the ability to take time out, timely access to peers with whom they can have supportive consultations, ability to undertake research; the ability to participate in professional activities such as conferences and continuing medical education;

- Ensuring staff employed within a regional service recognise the need to provide as much care as possible at an appropriate facility as close to the patients home as is feasible;

- Options for travel where travelling time is significant (e.g. >2 hours in each direction) should include flying, and where a number of staff are travelling to the same centre, the option of charter flights should be considered.

- Regular specialist outreach services should include appropriate transport, and reimbursement for travelling time and accommodation;

- The ability for specialist staff to undertake appropriate quality (including CME) and audit activities during the normal working week;

- The ability for recommended waiting times to be met when a proportion of the working day is spent travelling;

- A minimum of one clinic to be held per month to ensure new patients may be seen in an appropriate time frame;

- Clinic throughput should match the patient numbers entering the waiting list each month;

- Where travelling time is significant (e.g. >2 hours in each direction) consideration should be made for an overnight stay with clinics held on two consecutive days.

- Time should be available during the visit for the specialist to meet with other appropriate staff providing services at the outreach centre e.g. CAPD and satellite haemodialysis staff.
4.2. Prevention of End Stage Renal Failure

The majority of research looking at risk factors for renal disease has focussed on patients who have subsequently developed ESRF. A large community-based study in the USA\textsuperscript{11} over a 20-year period has identified that cardiovascular disease risk factors are also predictors of kidney disease. And, that diabetes, hypertension, obesity, smoking, low HDL-C level, and a mild reduction in glomerular filtration rate at baseline are important risk factors for the development of new-onset kidney disease.

During 1999 and 2000 Australia undertook a national population-based cross-sectional survey [The Australian Diabetes, Obesity and Lifestyle Study (AusDiab)], to determine the prevalence of diabetes mellitus, obesity, and other cardiovascular risk factors in Australian adults. Data was also collected relating to indicators of kidney damage. Analysis of this data showed that approximately 16% of the Australian adult population have proteinuria, haematuria, and/or reduced GFR, indicating the presence of kidney damage, and are at increased long-term risk of developing ESRF\textsuperscript{12}.

The only significant screening of a ‘whole’ population is the work done in Japan\textsuperscript{13} (Iseki 1983). This team followed 18+ year olds over 10 years to see which of them developed renal failure. One conclusion of this work is that whilst causative factors may be known, the most important determinant was the monitoring of creatinine trends in an individual's blood results.

While screening of an entire population is not recommended, identification and monitoring of populations most at risk will have a significant impact on the number of people who develop ESRF. In Australia the Aboriginal population have a cardiovascular disease risk five times that of non-Aborigines and an incidence of ESRF 20-fold and rising. Hoy et al\textsuperscript{14} screened 90% of the adult Aboriginal population in a community in the Northern Territory, treated the hypertension, advised on smoking cessation, treated diabetes mellitus and lipid levels and advised on alcohol intake. The 2-year evaluation point (Dec 1998) demonstrated an estimated 50% fall in the incidence of ESRF and natural deaths. The survival rate of 50% over the control group has been confirmed at the evaluation undertaken at 3.5 years.

To slow the progression of chronic renal failure and prevent the increasing number of patients developing end stage renal failure it is critical to intervene early\textsuperscript{13,14}. Primary care providers can contribute to the primary and secondary prevention of renal disease though the detection and management of diabetes, hypertension, urinary tract infection, obstructive uropathy and mild chronic renal failure. Public health initiatives that focus on obesity, smoking cessation and reduction of cardiovascular disease may also contribute to a reduction in renal disease. The New Zealand Māori and Pacific people populations have a significantly higher incidence of ESRF than the European population (See Table 1).

Mild chronic renal failure is often unnoticed but it is the diagnosis and intervention at this time that will allow patients to gain control of their renal function and live without the significant impact that moving to ESRF and the associated treatments will bring.

Management of chronic renal failure is a primary care function but education and support are required to promote the opportunities and benefits of identification and evaluation of at risk patients. To enable this to occur a Chronic Renal Failure Management programme is required that can be made available to PHO providers. This would include:

- Identification of ‘at-risk’ patients;
- Diagnostic tools;
- Recommended treatment options;
- When to refer patients to a nephrologist;
- Multidisciplinary renal team support.

Initial discussions with GP liaison and PHO Clinical staff indicate that opportunities for this programme include: determining options for laboratory reporting of calculated creatinine clearance rather than serum creatinine; using existing communication tools e.g. newsletters, pharmacist facilitators, peer group meetings; appropriate packaging of the programme.

This programme has potential to be a funded through PHO Services to Increase Access (SIA) programme or as a component of a PHO Care Plus\textsuperscript{15} service. Care Plus is a new service being
introduced through Primary Health Organisations from 1 July 2004 onwards. It is aimed at people who need to visit their family GP or nurse often because of significant chronic illnesses such as diabetes or heart disease, have acute medical or mental health needs, or a terminal illness.

Resource requirements for a Chronic Renal Failure Management programme include:

- Nephrologist time for development of the clinical programme;
- Implementation team - resource from within renal team, including nephrologist and renal nursing staff; PHO representatives from across the region to determine best approach for implementation and ongoing support;
- Development of a specialist nurse as an educator / resource nurse. It is envisaged that this would be a 1 FTE for a 12 month establishment period, then review resource needs ongoing;
- Promotion of a renal multidisciplinary team support network for general practice.
- Educational resource material;
- Development of information flow from general practice to the renal service to allow identification, follow-up and monitoring of patients.

Recommendations

That priority is given to the resources required to develop and implement a Chronic Renal Failure programme with primary care.

Resources required include educator resource (1 FTE for 12 months, then review), staff development – internal and primary care; resource material; and information systems to support transfer of information.

4.3. Identification and Management of Early Disease

4.3.1. Early Referral

The New Zealand Renal Advisory Group and the Ministry of Health have developed Guidelines for the Safe Practice of Dialysis in New Zealand – Issues in Nephrology Relevant to Standards of Practice (Appendix One). These guidelines indicate that 80% of all patients accepted for renal replacement therapy should have been referred at least 3 months prior to commencement of dialysis and more than 60% should have been referred at least 6 months prior to the need for dialysis. In New Zealand in 2002 27% of all new patients were referred within 3 months of the first treatment.

The Cari Guidelines indicate that patients with creatinine clearance < 30 ml/min/1.73m² are at high risk of progressive deterioration in renal function and should be referred to a nephrology service for specialist management of renal failure and to allow time for adequate preparation for dialysis. Earlier referral should be considered in patients who are hypertensive or who have significant proteinuria (>1g/24hours) as these clinical features suggest that residual renal function may decline rapidly.

Patients with advanced chronic renal failure experience a gradual progressive decline in renal function so that end-stage renal failure eventually occurs. Late referral (less than three months prior to commencement of dialysis) of patients with renal failure is associated with increased patient morbidity and mortality, increased need for, and duration of, hospital admission and increased initial costs of care following the commencement of dialysis. Data from Waikato for early and late referred patients shows differences in patients’ albumin, need for temporary access and days spent in hospital (See Table 19). These outcomes can be improved by referring patients with chronic renal failure to a nephrology service well in advance of the need for dialysis. A paper using ANZDATA information and published in the Medical Journal of Australia in 2002 concluded: ‘late referral is associated with

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* Cari (Caring for Australian's with Renal Impairment) is a national evidence-based project that commenced in 1999 with funding from the pharmaceutical industry. The two bodies responsible for the Cari Guidelines are the council of the Australian & New Zealand Society of Nephrology (ANZSN) and the board of the Australian Kidney Foundation (AKF). The aim of the Cari Guidelines is to improve the health care and outcomes of paediatric and adult renal patients by helping clinicians and nurses to adhere to evidence-based medical practice as often as possible. It is anticipated that the guidelines will serve as both a valuable educational resource and a means of enhancing the quality, appropriateness, consistency and cost-effectiveness of renal health care.
increased mortality, even among those who survive their first year on dialysis. Improving the quality of pre-dialysis care might improve access to transplantation and long-term survival. General practitioners could minimise late referrals through targeted screening of high-risk individuals. \(^{16}\)

### Table 19. Late referral – Waikato Renal Unit Sept 2000 – Sept 2001

<table>
<thead>
<tr>
<th></th>
<th>Late Referral</th>
<th>Early Referral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>38%</td>
<td>43%</td>
</tr>
<tr>
<td>Albumin</td>
<td>30gm/l</td>
<td>34gm/l</td>
</tr>
<tr>
<td>Temporary Central Venous Line</td>
<td>70%</td>
<td>30%</td>
</tr>
<tr>
<td>Days in Hospital</td>
<td>24.2</td>
<td>9.3</td>
</tr>
</tbody>
</table>

The New Zealand Renal Medicine Referral guidelines are included as Appendix Two. These provide recommendations on early referral and use of creatinine clearance monitoring (not just serum creatinine) however current referral patterns indicate that patients frequently have had renal failure for a significant period of time before being detected. These guidelines also recommend a patient with diabetes and microalbuminuria be referred to the diabetic service. With the development of the Chronic Renal Failure Management programme it will be important that the diabetologists and diabetic nurse educators across the Midland region are aware of, and able to promote the programme to primary care physicians and patients. Promotion of early referral will be a component of a Chronic Renal Failure Management Programme.

**Creatinine Clearance Reporting**

There is a reciprocal relationship between glomerular filtration rate (GFR) and serum creatinine that means serum creatinine may not rise above the reference range until the GFR has fallen to half the normal value. This affects patients with low muscle mass (e.g. many elderly patients). Creatinine clearance calculations provide an estimate of a patient’s GFR, which is not perfect but significantly more accurate than a serum creatinine level through inclusion of age, sex and body weight factors.

The New Zealand Renal Advisory Group, in association with an Australasian ChemPath Group, is reviewing the options as to the appropriate creatinine clearance formula for the population and the options for creatinine clearance to be included routinely in reports to physicians. It is intended that this will be implemented nationally.

### 4.3.2. PRE-DIALYSIS

Patients and their families or carers should receive sufficient information and education regarding the nature of end stage renal failure, and the options for the treatment to allow them to make an informed decision about the management of their end stage renal disease. This can only be effective when patients are referred early in the disease stage to allow options to be presented and time for consideration. ANZDATA reports indicate that in New Zealand in 2001, 25 %, and in 2002, 27%, of all new patients were referred less than three months prior to their first dialysis treatment.

Waikato currently provides a multidisciplinary pre-dialysis programme through a team of nurse educator, social worker and dietician. The team provides education about ESRF options and management, including nutritional and anaemia management, choice of dialysis modality, consideration for transplantation, creation of dialysis access, planned entry onto ESRF programme. Preparation takes about one year.

Clinical management of patients when referred early might include:

- Hypertension and cardiovascular disorders management;
- Optimising dietary protein and calorie intake;
- Management of anaemia and potassium;
- Serum bicarbonate and acid-base balance control;
Bone, dermatological, gastrointestinal, central nervous system, and sexual dysfunction disorder management.

**Nurse Educator**

Patients are referred to the nurse educator who sees patients at an initial visit. At the second visit, which may be up to 3 months later, the patient will also see the social worker and dietician. This service is provided on site at Waikato Hospital. The current ratio of nurse educator to pre-dialysis patients is 1:110. The recommended level for a pre-dialysis nurse is 1FTE: 70 patients. If this ratio was reached opportunities for improving the pre-dialysis service could be implemented including:

- Managing the peritoneal and vascular access waiting lists;
- Involvement in pre-operative work-up;
- Monitoring and follow-up of vaccination status (including Hepatitis B) through database management;
- Ensure 3 monthly follow-ups until close to needing dialysis and then at more frequent intervals.

**Dietician**

A dietician is an essential member of the pre-dialysis team. Chronic renal failure patients are often malnourished and there is a strong link established between malnutrition and mortality and morbidity rates in renal disease patients. The dietician develops a plan of nutritional care for each patient to provide both the chance of delaying the onset of dialysis and improving the outcome once dialysis is commenced. The current resource is limited and allows little opportunity to follow-up patients.

**Social Worker**

Additional social worker services would support addressing patient needs prior to commencing dialysis that might include:

- Adjustment to chronic illness and treatment as they relate to quality of life;
- Physical, sexual, and emotional relationship problems;
- Educational, vocational, and activity of daily living problems;
- Crisis and chronic problem solving;
- Problems related to treatment options and setting transfers;
- Resource needs, including finances, living arrangements, transportation, and legal issues.

**Other**

Additional occupational therapist resource would allow a functional assessment to be undertaken at the patient’s home to ensure all aspects of patient functionality are considered when determining the most suitable modality of dialysis.

The Pre-Dialysis programme has much potential to benefit patients but will only be fully effective when patients are referred early to the renal service, ideally 12 months prior to needing dialysis. Pre-dialysis programmes may also include an occupational therapist, pharmacist and nephrologist.

**Recommendations**

That pre-dialysis staffing requirements needed to meet the objectives of the programme are reviewed in line with the levels recommended in Section 5 of this paper.

**4.4. Provision of a High Quality Renal Replacement Programme**

The Guidelines for the Safe Practice of Dialysis in New Zealand – Issues in Nephrology Relevant to Standards of Practice (Appendix One) indicate that for people irrespective of age, ethnic background and locality to quality renal replacement therapy.

- Entitlement to early referral to Renal Services (in line with the National Referral Guidelines for Renal Medicine) for the diagnosis and management of renal disease, treatment to delay the
progression of chronic progressive renal failure and timely preparation for renal replacement therapy if appropriate. Access for patients to:

- Patients accepted for renal replacement therapy to the full range of modalities of dialysis provided by qualified, credentialed staff under the direction of a nephrologist;
- Specialist nephrologist;
- Renal transplantation if meets established national eligibility criteria;
- Vascular intervention (surgical and radiological) and PD surgery as required;
- Appropriate pharmaceuticals for the management of his/her condition;
- Allied health support.

The draft national Standards indicate the following access recommendations:

- All centres must provide access to both haemodialysis and peritoneal dialysis.
- All centres provide access to both independent (home/self care) and dependent (incentre/caregiver assisted) haemodialysis.
- All centres must offer either directly or indirectly a conservative care program for those who decline an offer of dialysis.
- All centres must offer at least a 3 times a week haemodialysis schedule for those with minimal residual renal clearance.
- Haemodialysis treatment duration, frequency and modality should be determined according to clinical need. These may include but are not necessarily limited to daily or nocturnal schedules, and high flux dialysis.

The choice of dialysis should be made in discussion with the renal team and may be dependent on medical and surgical factors (e.g. co-morbidities including obesity, cardiovascular disease, CAPD or transplant failure), resource availability (e.g. access to suitable water and power supply, distance to a satellite unit) and patient choice. All patients undergo a training programme prior to commencing dialysis. Training is provided at the Renal Centre at Waikato Hospital.

Accommodation is provided at Hilda Ross Hostel at Waikato Hospital for patients when training. As patients and carers have raised some concerns in relation to the accommodation, contact was made with the Cancer Lodge to determine whether this was an option for renal patients requiring accommodation for several weeks. However this lodge is fully occupied and unable to accommodate other patients. The specific patient concerns have not been identified within this document but it may be appropriate for follow-up on this issue to be undertaken by Waikato DHB in order to understand the concerns and address these where appropriate.

Appropriate transport is a critical component of a renal service for patients travelling on a regular basis for haemodialysis. This is not addressed in this service plan.

### 4.4.1. PERITONEAL DIALYSIS

Peritoneal dialysis may be Continuous Ambulatory Peritoneal Dialysis (CAPD) or Automated Peritoneal Dialysis (APD) which is machine driven.

The main complication of PD is the risk of peritoneal infection. There is a high demand for consumables and nurse support, and it is time-consuming. It does however allow greater independence than satellite or incentre haemodialysis.

Approximately 68% of Midland dialysis patients currently use peritoneal dialysis. This is due to a number of historical reasons. The aim is to move at 10% per annum to a 30:70 ratio of peritoneal dialysis: haemodialysis across the region.
4.4.2. Home Haemodialysis

Home dialysis is encouraged when patients can manage self-treatment (with a carer). It allows independence, the best rehabilitation and quality of life for patients compared with more dependent forms of haemodialysis. Back-up nursing and technical support are needed.

At July 2004, 21% of the Midland region dialysis patients were using home dialysis.

4.4.3. Satellite Haemodialysis

Satellite haemodialysis units allow patients who are not suitable for home dialysis but able to self manage dialysis with some nursing support, to dialyse at a centre generally closer to their home than the incentre unit. Satellite haemodialysis requires on-site nursing staff with technical support available.

The first Midland region Satellite Haemodialysis unit opened in Tauranga in July 2004. In October 2004 there are 6 patients (2% total dialysis patients) undertaking haemodialysis at this unit, which has six stations. Further satellite haemodialysis units are planned for the Midland region. See the Regional Renal Satellite Haemodialysis Plan for details.

4.4.4. Incentre Haemodialysis

The incentre haemodialysis unit provides haemodialysis for patients who are unable to manage home haemodialysis and do not have access to a satellite unit, for those that are unstable and require medical assessment and also for patients on a short-term basis for a variety of other reasons.

Patients have to travel three times a week to access this service and have four to six hours of dialysis each visit. There is a high level of nursing support and generally medical support on-call.

The incentre renal facility at Waikato Hospital is currently fully utilising the 12 stations and with two shifts per day, 6 days per week. The options available to improve access to this service are:

- To extend the hours have been reviewed, however there are limited patients who are willing or able to dialyse in the evening or overnight to make the additional shifts viable;
- Development of satellite haemodialysis facilities around the region to retain the incentre facility for fully dependent patients;
- Extend the current facility to allow an increase in the number of stations.

4.4.5. Outpatient Clinics

First Specialist Assessments and subsequent attendances are contracted for and provided at each DHB. A recommended ratio for renal medicine of 1:12 FSA: subsequent attendances, has been made in the UK. The ratio for the Midland region in 2002 was 1: 7.7 and in 2003 was 1: 8.4.

With the limited resource of nephrologists it has become increasingly difficult for all clinics to be provided at the facility closest to the patient's home. However, the provision of outreach clinics has continued, although the increase needed to meet the need has not always been available, either contractually or through physical or specialist resource. The nephrologist who travels to Tairawhiti generally stays overnight and provides clinics on two days.

As noted earlier the waiting times for renal medicine clinics are currently outside of the recommended waiting times.

4.4.6. Inpatient – Acute Services

The renal inpatient ward manages patients with acute renal failure (not requiring intensive care support), newly presented chronic renal failure, requiring investigation of renal disease, renal transplant, haemodialysis, and CAPD patients with complications. All renal inpatients beds are based at Waikato Hospital in Ward 24. Nursing staff in the ward must be familiar with all forms of dialysis.
The renal ward at Waikato Hospital has 16 beds and a 7-station acute dialysis facility. This meets current needs of the unit the majority of the time. The Health Waikato Clinical Services Plan predicts a 25.5% increase in admission bed days between 2001 and 2011 leading to a need for 19 beds by 2011 @ 85% occupancy.

**Recommendations**

Transport and accommodation are critical components of a renal service and while not addressed specifically in this service plan, concerns that arise should be addressed by the DHBs.

The incentre haemodialysis centre is running at capacity and the option for expanding this service will need to be addressed alongside the development of satellite haemodialysis units.

### 4.5. Support Services

#### 4.5.1. Surgical Services

Dialysis access is best provided by a multi-service team, including surgeons responsible for the creation of access, renal physicians, and renal nurses, and for the provision of vascular access, radiologist with vascular imaging and interventional skills.

The pre-dialysis and haemodialysis nurses run a vascular clinic for patients and coordinates the waiting list for access to the surgical procedures.

**Vascular Access**

Haemodialysis requires permanent access. These are three options, an arteriovenous fistula, a graft and a permacath. A fistula uses the body's own blood vessels only. A graft makes use of a synthetic tubing material. A permacath is a plastic tube inserted into the large vessels in the neck. A fistula is preferred whenever possible for there are fewer complications and the fistula survival is usually many years. Grafts are performed only when the vessels are small, deep or calcified and on average need revision or replacement every few years. Immediate short-term access may be provided through a vascath or a central line.

Permacaths are generally used as a temporary form of access, although older and sicker patients who have poor vascular access will use permacaths long term. The number of these patients receiving dialysis is increasing and consequently having an impact on radiology resources.

Ideally a fistula is created several weeks to months prior to commencement of dialysis to allow the vessels time to heal and strengthen (at least six weeks). Currently patients who are referred late and require urgent dialysis may have a temporary line, following by a permacath insertion, prior to the permanent vascular access being created. This impacts on the patient, as they may require three procedures when one is recommended (permacaths are also required to be removed surgically), and significant cost to the DHBs, including the impact on radiology and radiologist time for the insertion of permacaths.

An audit of access for dialysis patients has revealed that the service currently meets the needs of the patients. There are ongoing discussions with the surgical team to ensure both parties are aware of the needs and any issues that arise. Insertion of a fistula takes approximately 30 mins and is an appropriate procedure to fit into a theatre session rather than have a dedicated session each week with the current volumes.

The draft national Standards and Audit for Dialysis recommendations for Vascular Access are included in Appendix Three.

**Peritoneal Access**

Peritoneal (Tenckhoff) catheters are a soft synthetic tube that is surgically inserted into the abdomen. The exact site of exit on the abdomen is chosen in discussion with the patient. Ideally two weeks should be allowed for healing before commencing CAPD or APD.

Urologists at Waikato DHB surgically insert peritoneal dialysis catheters. The main issue identified has been access to theatre time, however a change from 1 November 2004 for a trial using main
theatre, rather than the day stay theatre, should ensure that there is appropriate access for patients requiring peritoneal catheter insertion. The procedure is short and can be incorporated into theatre sessions with other operations.

Urgent procedures can cause some difficulties in scheduling at times but are generally are resolved in discussion between the surgeons and the renal team.

In general the patients have significant co-morbidities making the procedure inappropriate to be undertaken at a private facility.

The draft national Standards and Audit for Peritoneal Dialysis recommendations are included in Appendix Three.

**Dedicated Access Resource**

An option for consideration is the appointment of a MOSS or interventional nephrologist who would specialise in permacath, vascular and peritoneal access. Interventional nephrology is an emerging subspecialty of nephrology incorporating: renal ultrasonography, ultrasound guided renal biopsy, catheter insertion for both haemodialysis and peritoneal dialysis, and permacath or central line insertions for arteriovenous haemodialysis access. A number of these are performed on an outpatient basis due to improved access to the resource required to perform the procedure and minimising hospitalisations and costs\(^\text{18}\).

Appointment of this resource would allow one individual to become an expert in placement, removal and management of access, and supplement the surgical, radiology and nephrologist resources.

**4.5.2. RADIOLOGICAL SERVICES**

Access to radiology for ultrasound, x-rays, CT and MRI is required. Radiology is also required for renal biopsy and central line and fistula management.

Interventional radiology is utilised increasingly by the renal service. Acute management of blocked fistulas and grafts is by interventional radiologists with thrombolysis, proceeding directly to angioplasty if indicated.

The demand for radiology services by the renal service is growing and impacting on the need for experienced intervention staff and the number of procedures. These include angiography, CT duplex ultrasonography and magnetic resonance studies particularly magnetic resonance angiography (MRA) and magnetic resonance venography (MRV). The largest impact identified by the Waikato Radiology Department is the ever-increasing request for insertion of permacaths. See Table 20.

<table>
<thead>
<tr>
<th>Year</th>
<th>Permacaths Inserted</th>
<th>Full-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>36 – 9 months</td>
<td>48</td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td>78</td>
</tr>
<tr>
<td>2004</td>
<td>61 – 8.5 months</td>
<td>86</td>
</tr>
</tbody>
</table>

The increase in renal transplants will also impact on DEXA scan requirements. Bone densitometry measurements by DEXA scanning should be performed on all patients prior to transplantation. This should be performed not only to screen for pre-existing bone loss as renal patients are predisposed to osteoporosis, but also to establish a baseline in patients who will require long-term administration of glucocorticoids as part of an immunosuppressive post transplantation regimen. DEXA scans are currently purchased from a private provider.

The proportion of patients utilising haemodialysis, and undergoing renal transplantation is planned to increase and with the late presentation of patients and the proportion of older patients increasing, the ability for the radiology department to manage this workload must be included as a component of ongoing planning.
4.5.3. LABORATORY SERVICES

Renal patients require ongoing laboratory monitoring of renal function, anaemia, acid-base balance etc. Access to phlebotomists and laboratory services is critical.

Renal pathology services are also required for renal biopsy which may be required as an emergency service as treatment of some conditions required accurate diagnosis e.g. Wegner’s granulomatosis.

Access to histopathology and immunogenetic services is required for HLA typing, antibody screening and crossmatching services to support the work-up for renal transplant. This is currently provided from the Auckland Hospital laboratory for all New Zealand.

Access to community laboratory results as a component as ongoing monitoring of patients, including those with chronic renal failure and those in pre-dialysis programmes, would ensure accurate and timely service for patients and strengthen the integrated care approach to service delivery.

4.5.4. PALLIATIVE CARE

There are patients referred to renal medicine, some of whom will be unsuitable for RRT and some who may chose not to dialyse, while other patients may choose, at any time, to stop treatment. All ESRF patients have a shortened life expectancy and a decreased quality of life. Good renal palliative care depends on understanding the needs of the dying and their carers. A joint holistic approach is required with the ability to respond to patient’s physiological, practical, emotional and financial needs.

Palliative care services should be available for patients who have withdrawn, or are not suitable for active treatment. In the ideal situation palliative care should be integrated into the dialysis setting with members of the renal multidisciplinary team undertaking training that allows support to be provided to assist patients achieve a ‘good’ death\textsuperscript{19}. It is appropriate for at least one renal nurse to undergo postgraduate palliative care training.

Training options include:

- Waikato Hospital Palliative Care team teaching session on general principles and symptom management.
- Post-graduate level Palliative Care paper from University of Auckland starting 2005. Contact Yvonne Bray at the Goodfellow Unit (09) 373 7599.
- Masters level Palliative Care paper through Victoria University This course offers practitioners an advanced clinically orientated course designed to meet the needs of contemporary palliative care nursing and could be focussed on the specific needs for renal patients. Note this paper is NZQA funded. Contact: (Dr) Margie Martin, on (04) 463 5442.

There should be, at a minimum, a strong relationship between the renal staff and each of the DHB palliative care and hospice services.

Currently there are significant variations across the region in palliative care services. There must be strong links developed between the services to ensure that palliative care incorporate renal patients into their planning for the future. This is a service area that the regional renal centre would like to see develop as part of the integrated multidisciplinary approach to care.

Because of the nature of ESRF end-of-life care needs to be part of the continuum of quality patient care for ESRF patients.

4.5.5. PATIENT PERSPECTIVE

As a service managing chronic illness the renal staff have long standing relationships with the patients and family and whānau. The changes recommended are based on international best practice, however it is an important consideration to ensure that the patients have an opportunity to comment on proposed changes and to see what they would like to see done differently. Development of a simple patient questionnaire is proposed to ensure that patients are aware and have opportunity to input into the renal service plans.
Recommendations

The appointment of a MOSS or interventional nephrologist would allow one individual to have primary responsibility for management of patient dialysis access sites. This position would support the renal service and decrease demand on radiologist and surgical services by the renal service and ensure development of expertise in this critical area of patient care.

The impact of increasing renal patients on the radiology department and staff, in particular at Waikato Hospital, should be noted. The specific requirements for the service have not been identified within this plan but the impact of the growth of renal services must be taken into consideration in the long and short term planning of the radiology services across the region.

That links with palliative care services across the DHB regions be developed to ensure appropriate end of life care is provided to all patients who withdraw from therapy.

All members of the renal team should understand the general principles of palliative care through the attendance of a basic teaching session with the palliative care unit at Waikato DHB.

That Waikato Hospital supports at least one renal nurse, nominated by the renal team, to undertake postgraduate or masters level qualification in palliative care.

Development of a simple patient questionnaire is proposed to ensure that patients are aware and have opportunity to input into the renal service plans.

4.6. Organ Donor Promotion Programme

4.6.1. Transplantation

It is accepted that the most effective treatment for ESRF is renal transplant, from a quality of life\textsuperscript{20}, length of life\textsuperscript{21}, and cost perspective\textsuperscript{22,23,24}. The annual cost\textsuperscript{2} for dialysis can range from approximately $21,000 for CAPD to $49,000 for in-centre and satellite haemodialysis, while kidney transplants have a one-off cost of between $50,000 - $70,000\textsuperscript{25} with on-going costs for immunosuppressant drugs. It must be recognised that not all patients are suitable for transplant, generally due to co-morbid conditions and, there is an increased risk of mortality within the first few weeks of transplantation. The Renal Medicine: Waiting List Criteria for Renal Transplantation is attached as Appendix Three.

A minority of patients with planned entry into renal replacement therapy can avoid dialysis by ‘pre-emptive’ transplantation. This option is generally only available where there is a living donor, as cadaveric transplantation cannot be planned. The Guidelines for the Safe Practice of Dialysis in New Zealand indicate that every patient on the RRT programme, following appropriate assessment, if medically suitable, is offered the opportunity of renal transplantation. This should occur once the patient’s native creatinine clearance has reduced less than 15ml per minute adjusted, or as soon as possible after the establishment of dialysis. For the majority of patients time on dialysis is a reality with the average wait for a kidney being 2-3 years.

Table 21. Comparison of International Transplant Operations per Million population 2001 (USRDS)

<table>
<thead>
<tr>
<th>County</th>
<th>Transplants pmp</th>
<th>County</th>
<th>Transplants pmp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>3.1</td>
<td>New Zealand</td>
<td>29</td>
</tr>
<tr>
<td>Philippines</td>
<td>3.1</td>
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<td>Turkey</td>
<td>12</td>
<td>Finland</td>
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</tr>
<tr>
<td>Greece</td>
<td>17</td>
<td>Canada</td>
<td>34</td>
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<tr>
<td>Korea, Republic of</td>
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The ANZDATA Registry 2003 Report\(^1\) indicates that in New Zealand the number of transplant operations in 2002 represented 6% of all dialysed patients, the same as in 2001, with 8% of dialysed patients in the 15-59 year age group. In Australia there were 6.8% in 2002, compared to 6.4% in 2001, with 12.3% of the 15-59 year age group. A comparison of the transplant rates per million population with other countries is provided in Table 21.

While it is recognised that there will never be enough organs to cope with the demand, New Zealand has one of the lowest organ donation rates in the world (Table 21). In 2003 there were around 320 people on the kidney transplant waiting list of whom 19 died whilst on the list. A study undertaken by an Intensivist from Auckland Hospital looked at a prospective audit of death and organ donation in New Zealand and from this he determined that an achievable organ donor rate for New Zealand would be 15 pmp. (Quoted in reference\(^23\)).

Justin Roake, Professor and Head of Surgery at Christchurch Hospital published an editorial in the New Zealand Medical Journal in 2002 that identified three key factors for improving New Zealand’s organ donation rate\(^26\):

- Ensure that all intensive care unit staff recognise all potential donors;
- That consent for organ donation is sought in an appropriate way in all cases;
- Address other issues leading to low rates of consent e.g. public education on the need and benefits of organ donation, the understanding of brain death and its implications, specific cultural issues for Māori and Pacific people.

<table>
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There is currently a national debate on the future direction for organ donation and the Human Tissue Act. A summary of the issues is provided in a recent article “Over my dead body: the ethics of organ donation in New Zealand” published in the New Zealand Medical Journal\(^27\). More detail on the changes that are proposed for a National Organ Donor Agency and the Human Tissue Review are provided in sections 4.4.2 and 4.4.3.

Despite the high incidence of renal disease in Māori and Pacific people the transplantation rate is low in comparison to the European population (Figure 11). As at November 2004 there are 60 Midland region patients (20% of dialysis patients) who meet national criteria and are on the waiting list for transplantation. The transplantation rate of Māori on the waiting list is equivalent to the European population. However, a higher proportion of Māori do not meet transplant criteria (Appendix 3), due to underlying significant coronary heart disease and/or are obese (i.e. body mass index (BMI) > 35).
In 1999 Te Puni Kokiri published Hauora o te Tinana me ōna Tikanga: a guide for the removal, retention, return and disposal of Māori body parts and organ donation: Service providers. This document aims to provide a guide for health services, hospitals and health professionals when dealing with Māori body parts to ensure certain cultural considerations are taken into account.

A companion document, Hauora o te Tinana me ōna Tikanga: a guide for the removal, retention, return and disposal of Māori body parts, organ donation and post-mortem: Māori and their whānau, has also been prepared to inform and assist Māori and their whānau about the current processes of removal, retention, return and disposal of body parts, organ donation and post-mortem procedures. These documents are available on the Te Puni Kokiri website.

4.6.2. NATIONAL ORGAN DONATION AGENCY

Currently the National Donor Co-ordination Office, based in Auckland and funded through Auckland DHB, provides an effective co-ordination service for all organs donated in New Zealand. The service has 2 FTE donor co-ordinators, one of whom manages the service. The services provided include:

- Coordination of all organ retrievals in New Zealand
- Coordination of liver offers from Australia
- Coordination of tissue donors
- Follow-up and ongoing support from donor families
- Provision of procedures and guidelines for organ donation
- Education for health professionals
- Public education and promotion.

It is recognised that there are limitations of the current service and a proposal has been submitted to the Ministry of Health to increase organ donation in New Zealand through establishment of Organ Donation New Zealand. This proposal recommends that to increase organ donation in New Zealand through education for health professionals and public awareness increased funding is required.

The Manager of the National Donor Coordination Office, Janice Langland, has indicated that negotiation is currently underway with Auckland DHB for the increased funding required to implement the proposed changes.

4.6.3. MINISTRY OF HEALTH - REVIEW OF THE REGULATION OF HUMAN TISSUE-BASED THERAPIES

The New Zealand Ministry of Health is currently undertaking a Review of the Regulation of Human Tissue-based Therapies. A discussion document has been developed and consultation meetings and Hui took place in the first half of 2004. The document is available on the Ministry of Health
The review covers a large number of issues including the safety of tissue-based therapeutic products, including whole organs for transplantation, stored and banked tissue, and other tissue-based therapeutic products.

Facts identified in this review include:

- At any one time there are about 350 people on the waiting list for organ transplants, and of these, about 300 are waiting for a kidney transplant.
- Increased waiting times for patients on transplant waiting lists are associated with increased periods of hospitalisation, increased morbidity at the time of transplantation, longer rehabilitation following transplantation and death while waiting for a suitable transplant to become available.
- The number of organs and tissues available for transplantation in New Zealand has remained relatively unchanged over the past ten years.
- New Zealand has one of the lowest organ donor rates in the world at 9.6 donors per million population (Australia – 10.4, Italy – 18.1)
- The number of cadaveric kidneys retrieved for transplantation has remained unchanged in the last ten years (75 in 1998, 69 in 2002)
- The live kidney transplant rates have increased (31 in 1998, 48 in 2002)
- It has been estimated that even with very proactive strategies to recruit donors there will still be a significant gap between the demand for organs and the supply.
- Factors influencing New Zealand’s donor rate include:
  - Reduction in road traffic deaths and other tragic events naturally limits potential donors;
  - The number of intensive care beds available;
  - Whether health practitioners identify potential donors and seek consent to organ and tissue donate;
  - Whether people are willing to donate organs or tissue;
  - Whether the surviving relatives consent to donation.

In August a request was made to the MoH to determine the current position of this review and the MoH’s role in promotion of organ donation. The full response received from Gillian Durham, Deputy Director General - Sector Policy, Sector Policy Directorate, Ministry of Health is attached as Appendix Five. A summary is included here:

_The Ministry is currently analysing the submissions received on the Human Tissue Review’s Discussion Document. It is envisaged that a summary of the submissions, identifying major themes and suggesting principles for the development of legislation on the use human tissue, will be sent to the Minister of Health for her consideration in August 2004. The Ministry is aiming for legislation to be introduced to the House of Representatives before the end of this year._

_The Government response stated, "The Government supports an ongoing public awareness campaign in principle. However before such a campaign commences the national organ donation agency needs to be established as it is envisaged that part of their responsibility will be to educate health professional and provide information on organ donation to the public and the media. Any public awareness campaign needs to be based on sound evidence, cost effectiveness and be regularly reviewed."

The Government also announced in August 2004 that consideration is being given to the issue of welfare assistance for live donors.

The Review of the Regulation of Human Tissue and Tissue-based Therapies: Submissions Summary published in September 2004 includes responses to the consultation document that will have relevance to the transplant programme into the future. Of most relevance to this service plan are the submissions that relate to Māori and Pacific peoples and cultural considerations for organ donation. These sections have been copied from the MoH document and are included as Appendix Six.
4.6.4. **Waikato Current Situation**

**Waikato Renal Transplant Coordination**

Waikato DHB provides care of patients both pre- and post-transplantation and provides co-ordination of patients while on the transplant waiting list and as they are prepared and transferred for transplant surgery at Auckland Hospital. All transplants are undertaken by the Auckland Renal Transplant Group.

The Waikato Renal Centre has employed 1 FTE Transplant Coordinator (through two part-time staff) since 2003. The coordinator role includes ensuring the transplant waiting list is maintained, attending transplant clinics and providing a liaison role for potential and transplanted patients, including follow-up and education. A renal transplant meeting is held in Auckland on a monthly basis where the patients are presented to the transplant team. The coordinator may attend this meeting with the nephrologist.

The number of patients on the waiting list and the proposed increase in renal transplants will place additional demands on this service, which will require additional resource to manage the patient numbers. With approximately 15% of the increasing number of dialysis patients on the transplant waiting list there is rapid growth in the workload. The current patient workload includes approximately 60 dialysis patients on the transplant waiting list, 130 functioning transplant patients and a further 40 pre-dialysis patients undergoing work-up for potential transplantation. The 2 x 0.5 FTE do not have the ability to do more than the minimum to manage this service. Currently the nephrologists undertake the transplant patient follow-ups and there is no database to ensure recall for specific follow-up service needs e.g. Dexa scans, blood tests. To better manage this service it is anticipated that 1.5 – 1.6 FTE are required for the currently workload.

Strong links are maintained with the National Organ Donor Co-ordinators. The roles are complementary as the National Co-ordinator focuses on maximising cadaveric transplant opportunities and the supportive processes required. The local renal transplant coordinators focus on ensuring the systems and processes are in place for individual patients to enable renal transplantation to occur when a kidney is made available, whether from a cadaveric kidney or live donor.

The renal team includes one FTE social worker whose role predominantly revolves around supporting patients both before and after transplantation. Examples of this support include: organising transport and accommodation, home visiting and follow-up of all renal transplant patients.

**Cultural Considerations**

An initial discussion held with Māori representatives in the Bay of Plenty identified that there are cultural considerations in relation to organ transplantation; both for cadaveric and live donation and that these do vary between Iwi. These views are confirmed in the Human Tissue Review Submissions Summary. While the Te Puni Kokori publication provides a framework for consideration individual iwi issues are not addressed. To understand the specific considerations for Iwi in the Midland region a full consultation process may be required. To determine the options and opportunities and to establish the framework of any consultation a reference group of health professionals, Māori and non-Māori, transplant support people and transplant recipients from across the region should be established.

**Midland Approach**

There is a significant national focus on organ donation which is likely to result in a national approach to organ donation therefore it would be inappropriate for the Midland DHBs to put significant resource into this area. The most appropriate role of the DHBs would be to ensure that there is an understanding of the cultural considerations for the individual Iwi in the region. The Manager of the National Donor Co-ordination Office has indicated support of any initiative requiring information and or education.
Recommendations

That transplant coordinator resources be increased as recommended to meet increasing patient numbers – see workforce recommendations in Table 25.

That the Midland DHB’s establish a reference group of health professionals, Māori and non-Māori, and transplant recipients from across the districts to understand the considerations for Māori and individual Iwi in relation to organ transplantation and determine whether a full consultation process is required, and if so, the framework of any consultation.
5. **RESOURCE – WORKFORCE, SYSTEMS AND EQUIPMENT**

5.1. **Workforce**

Renal failure has a significant, life-long impact of patients and their families and whānau. To optimise clinical outcomes and enhance quality of life, staff from a variety of professions and support agencies are required to collaborate and together determine the best management option(s) for the individual.

The patient/carer undertakes some responsibility for their care and treatment in a partnership relationship with the multidisciplinary team. For this to occur they need open, honest relationships with members of the team with consistency of information and advise. An individual care plan available to all members of the team supports the continuity of care.

Access to the multidisciplinary team has been shown to enhance coping strategies and lead to better compliance and improved clinical outcomes.

**Multidisciplinary Team Approach**

The Midland regional renal service places high value on the multidisciplinary team approach. A team consisting of patient, physician, nurse, social worker, dietician, and other caregivers’ form the core from which quality care is designed and delivered. Continuing education, appropriate resources, and management teams at the regional and corporate level must support this team.

Currently the majority of this team is based at the renal centre at Waikato Hospital with CAPD nurses based in Tauranga, Rotorua, Whakatane and Gisborne. The development of satellite haemodialysis centres will increase the number of staff based outside of Hamilton. There is no specific medical or allied health expertise in renal medicine currently available outside of Waikato Hospital.

**Regional Policies and Procedures**

The regional renal management team requires protocols and recommendations in key areas of patient care such as delivery of optimal dialysis dose, anaemia management, management of calcium/phosphorus balance, and access care. Policies and standards should be consistent across the region. Development and review of a number of policies and procedures have, and continue to, take place since the appointment of a Renal Nurse Educator in early 2004.

**Multidisciplinary Team Members**

A multidisciplinary team would be expected to include experienced and qualified staff from a number of professions. Current and recommended staff ratios are included in Section 6.2.

5.1.1. **RENAL PHYSICIANS**

Renal physicians provide a wide range of clinical services for patients with kidney disease. The roles have traditionally involved leadership and provision of a renal replacement therapy programme. The need for greater involvement in prevention of ESRF through Chronic Renal Failure Management has already been identified. The renal service has a preference for general physicians, with an interest in nephrology, to be available to provide support in outreach facilities.

As renal physicians are in demand internationally due to the growth of ESRF, it is critical for New Zealand to review the training needs for Renal Medicine. Training in renal medicine takes 6-7 years. The Health Workforce Training Programme Analysis undertaken by the Clinical Training Agency in 2001 identified that New Zealand had one Nephrologist per 182,429 people in New Zealand. No specific information was provided in this document regarding proposed training positions required into the future to meet the identified need. A comparison of the Midland Regional Renal Service with other renal centres in New Zealand is provided in the Regional Renal Service Plan.

A fourth nephrologist employed in October 2004 by Waikato DHB is currently on a one-year contract.

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Renal nurses provide a wide range of activities supporting patients throughout the treatments required to management ESRF. The role involves patient and carer education, support and advocacy. The fewer allied health professions attached the renal team, then the greater involvement of the renal nursing staff, increasing the risk if outside of the nursing sphere of expertise.

Renal services are heavily dependant on nursing staff and it is critical that this workforce is addressed to ensure staff are available for all areas of the service. Specialist practice roles are required across the service to support and manage patients in each treatment modality. These roles are well established in renal nursing and include anaemia management, counselling, vascular access, transplant liaison and chronic renal failure management.\(^{32}\)

The renal liaison nurse recommended for the satellite haemodialysis services has a key role in ensuring that staff, in each of the outreach areas, has access to and understand any changes in practice or protocols. It is recommended that consideration be given to appointing a Liaison Nurse to the outreach CAPD service, to provide support for CAPD staff based outside of Waikato Hospital. All staff should have formal links with the ‘hub’ service.

It is recommended that consideration be given to an anaemia management nurse. Managing anaemia is complex, and can involve amending the dialysis regime, improving diet, giving iron supplements, or giving injections of erythropoietin. This position would enable the most clinically and cost effective combination of these interventions to be delivered, and ensure equitable access for all patients. This role would ensure that any clinical standard relating to anaemia is met and monitored e.g.: reasons for patients not achieving the target haemoglobin and ensuring appropriate action taken; iron status at regular identified intervals; and the number of patients receiving blood transfusions.

The reimbursement cost of erythropoietin beta for each DHB is shown in Table 22. Note the criteria for accessing erythropoietin was increased from 1 Dec 2002 leading to a significant increase in use from that time. Development of an anaemia management database would support this role and ensure cost-effective use of erythropoietin.

An option for supporting nephrologists is the development of Renal Nurse Practitioners who have prescribing rights. This will increase the options for nurse-led clinics and well as other supporting roles as there are likely to be ongoing difficulties in recruiting nephrologists with the predicted growth in ESRD internationally. It is recommended that support be provided for appropriate individuals identified to gain the relevant qualifications. The roles identified where Nurse Practitioners would provide the most benefit include:

- Dialysis Clinical Nurse Specialists;
- Transplant Co-ordinators.

No formal nursing post-graduate renal training programme is currently available in New Zealand. Training for staff is provided ‘on-site’ with staff encouraged to sit the BONENT examination. Eligibility for this examination includes: registered nurse qualification, one year of nephrology experience, and active participation in ESRD. The UK has a number of fundamental and advanced renal programmes. A number of states in Australia have also developed Nephrology Nursing programmes of various lengths and options. In New Zealand a group-of renal nurses are reviewing options for renal nursing programmes and will make recommendations to the Renal Advisory Group in relation to
options for credentialing that are likely to be in line with national nursing Professional Development and Recognition Programmes.

### 5.1.3. **Allied Health**

Renal Medicine functions through a multidisciplinary team. As with all professions it is important that individuals maintain continuing education and supports with member of their own profession. Therefore while there it is critical to have staff assigned to renal team the importance of peer contact must also be recognised.

**Renal Dietician**

Patients with renal disease have complex and changing dietary requirements depending of the degree of renal impairment, co-morbidity, modality of treatment, medications and other related events. Dietary modification can assist in management of hypertension and cardiovascular risk factors, improve phosphate control and optimise nutrition.

Responsibilities of the renal dietetic service include:

- Assessment of nutritional status
- Developing and implementing a plan of nutritional care
- Providing a nutritionally adequate diet
- Patient and staff education
- Monitoring of nutritional targets/standards
- Production of educational materials
- Audit and research

It is critical that dieticians are involved as a contact in any chronic renal failure management programme, with each patient during the pre-dialysis phase to maximise nutritional status prior to commencing dialysis, and sees all RRT patients for ongoing assessment. Evidence is available to show that specialist dieticians improve outcomes for renal patients. Patients should also have access to community dieticians close to their home rather than having to travel to see the dietician at the ‘hub’ for ongoing support.

**Renal Social Worker**

Renal social workers care for the needs of patients at the interface of health and social services, addressing the practical, economic, social and psychological problems of patients and carers, and helping those with end stage renal disease to cope with chronic disease, disability and eventually death and bereavement.

Responsibilities of the renal social worker service include:

- Pre-dialysis assessments
- Support to dialysis patients and carers
- Facilitating links with community services
- Post transplant adjustment to life post dialysis
- Supporting conservative management options
- Supporting palliative care options

Renal social workers based at the ‘hub’ have to liaise with and engage many community-based services across the DHB regions. Where social workers are not available it is often nursing staff that take on this role, often without the associated knowledge and understanding of services available across the region. Patients need to have access to community social workers to provide the much-needed support closer to home.

**Renal Clinical Psychologists**

The major role of clinical psychologists in supporting renal programmes is in the provision of evidence based psychological assessment/interventions. This involves work with patients with specific mental health problems including: anxiety, depression, trauma reactions, difficulty in adjusting to and coping with care regimes and treatments, as well as difficulties encountered in home, work and hospital
relationships as a consequence of renal problems and treatment. There is little research available
describing or evaluating the severity of psychological difficulties experienced by patients with renal
disease.

Waikato DHB currently has a Consult Liaison service that provides a limited psychologist service to
the renal team and patients. Access to other psychologist and psychiatric services is through the
generic mental health services at the individual DHBs.

Renal Clinical Pharmacist

Patients with renal disease or on RRT require a large number of medications. The elimination of
medications is compromised as a result of the renal failure and together with the complexity of the
medication regimes leads to increased risk of interactions and high therapeutic levels. Medicines
management is a core function of renal health services.

Responsibilities of the renal clinical pharmacist service include:

- Clinical pharmacy service to wards and dialysis units
- Pharmacy lead outpatient medication review
- Formulary and guideline development
- Provision of medicines information to patients, renal staff and non renal pharmacists
- Education and training of other clinical staff
- Clinical governance to manage medicines’ risk
- Monitoring analysis of medicines’ use, costs and patient outcomes
- Clinical trials and evaluation of therapeutic agents and regimes
- Strategic planning and service development

Pharmacy services are provided to the renal ward at Waikato Hospital through a pharmacist assigned
to the unit but there is no clinical pharmacist available to the majority of patients who are managed as
outpatients or receiving dialysis on or off site. In the future it is likely that prescribing rights will be
extended to pharmacists. This will provide options for expansion of the current role within the renal
service. It should be noted that there are currently few pharmacists with the appropriate postgraduate
clinical qualifications in New Zealand to undertake this role.

Occupational Therapy and Physiotherapy

The ability of renal patients to maintain independence and function optimally often requires
assessment and support from occupational therapists and physiotherapists. Improving the
independence of individuals may allow dialysis to continue for longer in the home and avoid the
increased costs of time and travel, and supports required with satellite or incentre dialysis.

A dedicated occupational therapy resource at each DHB would allow an occupational therapy
assessment to be a component of the pre-dialysis programme. This would incorporate a cognitive
assessment that would assist in the decision of type and location of dialysis for the patient at the time
this is required.

Management and Administration

The role and contributions of managers and administrators to renal services is variable depending on
the renal unit, but are recognised as an essential component required to ensure an efficient service.
The roles may include all or some of the tasks identified.

- Stock control, monitoring and procurement of dialysis consumables
- Contract monitoring
- Data entry and analysis
- Liaison with other DHBs
- Reporting of financial and statistical information to relevant DHB staff
- Strategic planning and development
- Service development
- Financial and budgetary control
- Implementation of local and national health policies
The role currently missing within the renal team is a resource to manage data. One of the major difficulties for the renal team is managing the patient flow, planning for service needs ahead of time – including providing data for this service plan, and providing the renal registry data. An analyst resource within the team to manage data and provide information to the relevant team members when required would allow not only better reporting but is essential to support processes for patients as they move from a chronic renal failure programme to pre-dialysis and RRT. Currently data is collated when required and is based on information at a specific time rather than across a period of time.

**Machine Technicians**

Haemodialysis is an advanced technology requiring high specification dialysis and water treatment equipment. Renal technicians provide equipment maintenance, calibration and repair, and quality management and controls assurance. Technicians’ work on the on-site haemodialysis equipment and haemodialysis machines located in renal patient’s homes across the region. The current 1.5 FTE are based in Hamilton and provide support for all machines situated across the across the region, other than those in the Tauranga satellite service, where a support contract is in place.

**Recommendations**

To meet the rapidly growing needs of the renal services it is critical that staffing levels are appropriate to deliver a safe and effective renal service that meets the needs of the patients. The significant timeframe required to attract clinical staff and train nursing staff means there is an imperative to address staffing requirements now and into the future in line with the levels recommended in Section 5.2 of this paper.

A Regional CAPD Liaison Nurse should be appointed to the outreach CAPD service, in a complementary role to the proposed Regional Satellite Haemodialysis Liaison Nurse role.

A new position of Anaemia Management Nurse be created to enable the most clinically and cost effective combination of anaemia interventions, and ensure equitable access for all patients.

Support is provided for appropriate nursing staff to undertake relevant qualifications to gain nursing practitioner qualification with prescribing rights.

Clinical Psychologist resource is available to provide support to patients who have an identified mental health need as a consequence of renal problems and treatments.

Occupational Therapist resource is available within each DHB region, to provide resource for patient assessment within the pre-dialysis programme.

A Data Analyst is appointed to the renal service at Waikato DHB to input and analyse data as required and support the quality and audit requirements of the service.

**5.2. Workforce Plan**

The number of ESRF patients is predicted to grow and the impact of any new initiatives will take time to affect the growth rate. The growth in ESRF is an international phenomenon and New Zealand will have difficulty attracting staff from overseas due to the high demand and increased recognition of the workforce issues internationally. The Midland service must plan and implement training options for staff to ensure the service can be delivered in a safe and appropriate manner into the future.

The British Renal Society established a multi-professional National Renal Workforce Planning Group in January 2001 to prepare recommendations for establishments and staffing levels across each professional group involved in renal healthcare. These recommendations were published in 2002 and are intended to complement the Renal National Service Framework. The New Zealand Renal Advisory Group on workforce are developing recommended staff levels. These are in the early stage of development but a copy has been provided by the Chair of the NRAB and has been used, together with the United Kingdom recommendations, as a guide for the future needs for the Midland Regional Renal Service.
For the purposes of this plan patient numbers are based on 15% for the areas of high Māori population: Eastern Bay of Plenty, Lakes and Tairawhiti and 10% for Western Bay of Plenty and Waikato. Discussion of these scenarios is provided in Section 3.3.

Current Service versus Service Development

In managing the current service there are a number of significant gaps, in particular these relate to nephrologists and allied health staff. Until these gaps are filled it is unlikely that the service can develop to provide the development such as the Chronic Renal Failure programme and other initiatives that reflect best practice.

Specific service development roles are discussed earlier in this document and include:

- Expansion of the pre-dialysis programme and staff required;
- Anaemia nurse;
- Liaison staff;
- Psychology liaison;
- Clinical pharmacist;
- Nurse practitioners.

It is recommended that consideration be given to the development of the renal service and the need for these specific roles, they are not critical to manage the current issues relating to the growth in patient numbers and staff shortages.

Regional Service

As the staff numbers are predicted to rise significantly over the next 7 years and many of the services will be delivered in the outreach centres, the opportunity for more staff to be based in these areas in time should be considered. However, it should be recognised that while nephrologists are employed centrally, Waikato Hospital will remain the ‘hub’ and provide centralised services for inpatients and incentre haemodialysis, while the outreach centres will operate as satellite services for CAPD, home haemodialysis, satellite haemodialysis and outpatient clinics. As the population and resources increase, the option for a second stand alone renal service in the region may need to be considered.

To support this approach all staff employed to provide services to renal patients across the region should have formal links to the ‘hub’ service. These links should be through employment agreements, policies and procedures, continuing education and communication processes, including relationships with liaison staff and consultants. Currently CAPD staff employed in the outreach DHB’s have informal but no formal links with the Waikato Renal Service. Appropriate formal links have been put in place for satellite haemodialysis staff.

Workforce Predictions

Table 24 identifies recommended workforce ratios, and Table 25 the predicted staff requirements for the Midland region. Assumptions used include:

- Predicted patient numbers as per Table 10;
- Inpatient, incentre and satellite nursing staff include leave allowance of 0.19 per FTE;
- Incentre haemodialysis staff averaged across levels of care;
- Satellite haemodialysis – 10% patients 2006, 15% 2011;
- Urban: rural ratio equal to 50: 50 for home haemodialysis;
- Urban: rural ratio equal to 40: 60 for peritoneal dialysis;
- 12 additional incentre/satellite machines + additional home patients included in machine technician staffing requirements;
- Incident rate of 119 pmp;
- 1 transplant coordinator per 50 patients waiting for treatment plus 1 per 100 total dialysis patients waiting for transplantation (calculated as 15% of total dialysis patients), plus 1 per 100 pre-dialysis patients undergoing work-up (calculated as 15% total dialysis patients).
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<td>1: 12 rural</td>
<td></td>
</tr>
<tr>
<td>Peritoneal Dialysis</td>
<td>1: 20</td>
<td>1: 25 urban RN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1: 12 rural</td>
</tr>
<tr>
<td>Machine Technician</td>
<td>1: 40 machines</td>
<td>NZ Cert Eng or equivalent</td>
</tr>
<tr>
<td><strong>Allied Health &amp; Support Staff</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Work</td>
<td>1: 70 dialysis 1:140 RRT</td>
<td>1: 100 RRT Diploma in Social Work</td>
</tr>
<tr>
<td>Dietician</td>
<td>1: 135 HD 1: 270 PD 1: 180 pre-dialysis</td>
<td>1:150 RRT Postgraduate Diploma in Dietetics</td>
</tr>
<tr>
<td>Pre-dialysis educator / coordinator</td>
<td>1:70 Incident Patients</td>
<td></td>
</tr>
<tr>
<td>Staff educator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Audit / quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>1:150 RRT</td>
<td></td>
</tr>
<tr>
<td>Clerical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transplant recipient Coordinator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical Pharmacist</td>
<td>1: 250 RRT</td>
<td>B.Pharm</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>1:500 RRT</td>
<td>B. Occupational Therapy or equivalent</td>
</tr>
<tr>
<td>Psychology Liaison</td>
<td>1:1000 RRT</td>
<td>1:600 RRT Diploma of Clinical Psychology</td>
</tr>
</tbody>
</table>

Note: In the future (date to be determined) dialysis nurses and clinical technicians will be required to be certified by, or practice under the direct supervision of a practitioner certified by, The NZ Board of Dialysis Practice.
Table 25. Predicted Staff Requirements for the Midland Region Renal Service

<table>
<thead>
<tr>
<th>Staff</th>
<th>Regional Renal Service</th>
<th>Recommended Staff Ratio</th>
<th>Recommended Staff Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current FTE</td>
<td>2004</td>
<td>2006</td>
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<tr>
<td><strong>Medical</strong></td>
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<td></td>
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<tr>
<td>Nephrologists</td>
<td>4</td>
<td>1:90 RRT</td>
<td>5.1</td>
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<tr>
<td>Registrars</td>
<td>2</td>
<td>1:2 nephrologist</td>
<td>2.5</td>
</tr>
<tr>
<td>RMO</td>
<td>2</td>
<td>Based on l/p #s</td>
<td>2.0</td>
</tr>
<tr>
<td>MOSS or Interventional Nephrologist</td>
<td>0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Inpatients</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ward Nursing</td>
<td>15.3</td>
<td>1:4 (per shift)</td>
<td>14.3</td>
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<tr>
<td>Ward Clerk</td>
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<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Dialysis</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>In-centre dialysis</td>
<td>14.8</td>
<td>1:4.6</td>
<td>15.5</td>
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<tr>
<td>Satellite Dialysis</td>
<td>1.2</td>
<td>1:5.7</td>
<td>1.2</td>
</tr>
<tr>
<td>Home HD support</td>
<td>4.2</td>
<td>1:25 urban</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1:12 rural</td>
<td>2.6</td>
</tr>
<tr>
<td>Peritoneal Dialysis</td>
<td>8</td>
<td>1:25 urban</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1:12 rural</td>
<td>10.2</td>
</tr>
<tr>
<td>Machine Technician</td>
<td>1.5</td>
<td>1:40 machines</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Allied Health &amp; Support Staff</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Work</td>
<td>1</td>
<td>1:100 RRT</td>
<td>4.6</td>
</tr>
<tr>
<td>Dietician</td>
<td>1.2</td>
<td>1:150 RRT</td>
<td>3.0</td>
</tr>
<tr>
<td>Pre-dialysis educator / coordinator</td>
<td>1</td>
<td>1:70 incident pts</td>
<td>1.2</td>
</tr>
<tr>
<td>Staff educator</td>
<td>1</td>
<td>1:50 staff</td>
<td>1.0</td>
</tr>
<tr>
<td>Audit / quality / data analyst</td>
<td>0</td>
<td>1:1000RRT</td>
<td>0.5</td>
</tr>
<tr>
<td>Management / Administration</td>
<td>1</td>
<td>1:150RRT</td>
<td>3.0</td>
</tr>
<tr>
<td>Clerical</td>
<td>2</td>
<td>1:200 RRT</td>
<td>2.5</td>
</tr>
<tr>
<td>Transplant recipient Coordinator</td>
<td>1</td>
<td>1:50 w/l, 100 pre-dialysis &amp; 100 tx pts</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Service Development Roles</strong></td>
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<td></td>
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<tr>
<td>Anaemia Management Nurse</td>
<td>-</td>
<td>tbd</td>
<td>1</td>
</tr>
<tr>
<td>Clinical Pharmacist</td>
<td>-</td>
<td>1:250 RRT</td>
<td>0.5</td>
</tr>
<tr>
<td>Liaison Nurses – CAPD &amp; Haemodialysis</td>
<td>-</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Occupational Therapy</td>
<td>-</td>
<td>1:500 RRT</td>
<td>0.9</td>
</tr>
<tr>
<td>Psychology Liaison</td>
<td>-</td>
<td>1:600 RRT</td>
<td>0.8</td>
</tr>
</tbody>
</table>
5.3. Systems

5.3.1. Integrated Clinical Information Management System

The renal service currently has limited access to patient information electronically. This has resulted in difficulty in planning and identifying service priorities, as well as the need to complete renal register information for each patient by hand each quarter. Good quality information is essential for supporting development of the Regional Renal Service.

The UK National Renal Workforce Planning group have indicated that appropriate development of suitable renal Information Technology will enhance patient care through improved data management, communication, audit, efficiency and a reduction in health related adverse events.

The Regional Renal Service Plan (December 2003) recommended that an integrated regional ESRF prevention programme across the Midland region should be planned and delivered supported by an appropriate information management system that allows ongoing management of patients and audit of procedures and outcomes according to national guidelines. The regional satellite haemodialysis working group had significant difficulty with the Waikato information systems identifying renal patients by modality, by domicile. To identify patient’s modality by domicile required staff to manually collect the information and provide a snap shot.

Options identified included:

- Integrate with Waikato DHB Knowledge and Information Strategy, or
- Develop a business case for a regional renal database with the 2 proven commercial patient and unit management IS packages and tools, or
- Christchurch and Auckland Renal Units are planning a feasibility study. This will take approximately three months to complete and will produce a full report on how viable a national renal database is, what it would cost, how it could be implemented and what hurdles would need to be overcome before implementing.

It should be noted that the Midland DHBs have agreed to move to the same information management platforms. This will happen over a period of time but is a step forward in ensuring consistency of information. In time, shared access of information where patients receive treatment at more than one facility, and including primary care links, is required in order to:

- Identify at risk patients;
- Ensure strategies to delay progression of disease are in place;
- Monitor patients in community;
- Ensure timely referral for dialysis preparation;
- Management of home and satellite dialysis patients;
- Audit practice and outcomes.

The Waikato DHB information strategy does not currently include moving to ‘e-forms’, which would provide the most benefit for some of the issues identified by the renal service. The Waikato DHB information strategy is to be reviewed in October 2004 by the new Chief Information Officer and it is possible that this option will be reconsidered at that time.

As there is likely to be a consistent approach to manage clinical information across all services within the DHBs in the long-term, any interim approach should be developed so that the information can be incorporated into the future systems.

The renal team has clear specifications and examples of databases that would at least provide some support to the services current needs. It is recommended that the most cost-effective option at this time is for an individual within the renal team to work with a member of the Information Management team at Waikato DHB, to develop a Business Case, identifying the options for an interim system to support the service until such time as the current information management systems are updated.
Recommendation

That the Renal team together with Information Management staff develop a business case to support the development of a database that will allow analysis of patient flow and the services. This database should be developed to allow incorporation into DHBs systems across the region and link with primary care systems in time.

5.3.2. LEADERSHIP AND SERVICE COORDINATION

While the development of an Integrated Clinical Network will benefit the patient and the staff who care for ESRF patients, there is also a need to strengthen the hub and spoke approach across the DHB regions.

Currently the Renal Centre based at Waikato Hospital provides renal services to the population of four of the five Midland DHBs. The service is known as the Waikato renal service. To promote the regional nature of this service a change of name to the Midland Region Renal Service would be a pragmatic move. It should be recognised that Waikato Hospital will remain the ‘hub’ and the other centres will operate as satellite services within the hub and spoke model.

The Clinical Director of the service is employed by Waikato DHB and does not have any formal mandate to develop services in the other DHB regions, other than through the contractual arrangements and any agreed service change. For this to be a true regional service it is essential to ensure clinical leadership is provided across the region through a Director or Coordinator of renal services who has responsibility for the development of renal services across the continuum.

Currently there are physicians identified as renal liaison staff at each DHB, although these individuals may not have any specific interest in renal medicine. As recommended for other services the Chief Medical Advisors should consider the options for input into planning of renal services across the region.

All staff employed to provide services to renal patients across the region, should have formal links to the ‘hub’ service and must be recognised as a part of the regional service. These links should be through employment agreements, policies and procedures, continuing education and communication processes, including relationships with liaison staff and consultants. Currently CAPD staff employed in the outreach DHB’s have informal but no formal links with the Waikato Renal Service. Appropriate formal links have been put in place for satellite haemodialysis staff.

5.3.3. ANNUAL REGIONAL RENAL FORUM.

A Regional Clinical Governance forum has been suggested. It is proposed that this forum meet at least annually to debate issues, provide education and feedback.

Careful thought needs to be given to this forum as there are few, if any, physicians with an interest in renal medicine at the outreach DHBs. An alternative would be to focus on further development of the education sessions with specific stakeholders e.g. primary care, as are currently planned. These sessions will provide a stepping-stone towards the Integrated Clinical Network and the support the relationship development required for the Chronic Renal Failure programme.

5.4. Equipment

5.4.1. RENAL INCENTRE AND SATELLITE HAEMODIALYSIS UNITS

A Midland Region Renal Satellite Haemodialysis plan has been developed and forms a part of the overall Midland Regional Renal Service Plan. This plan proposes that satellite haemodialysis units will be established within the region based on population need and resource to establish and manage. The acceptance of the increase in haemodialysis patient numbers and the development of satellite haemodialysis units will impact on the pressure on the incentre facility. Additional capital expenditure will be required for machines irrespective of where patients are treated.
5.4.2. HOME HAEMODIALYSIS MACHINES

The growth in home haemodialysis patients, while expected to remain at 20% of total dialysis patient numbers will grow and resulting capital expenditure will be required for home haemodialysis machines. Details of costs are included in the Regional Renal Service Plan 2003.

Recommendations

That the renal service be known as the Midland Regional Renal Service.

That a regional clinical leadership for renal services is provided through a Director or Coordinator of renal services who has responsibility for the development of renal services across the continuum of care within the Midland region (excluding Taranaki).

All staff, including CAPD staff, employed to provide services to renal patients across the region, should have formal links to the ‘hub’ service and must be recognised as a part of the regional service. These links should be through employment agreements, policies and procedures, continuing education and communication processes, including relationships with liaison staff and consultants.
6. **INTERNATIONAL PERSPECTIVE**

Review of the international literature identifies that the growth in end stage renal failure is an international phenomenon. However the majority of the literature found through Internet and Medline searching focuses on clinical management of renal disease and not on national strategies for managing the growth, service delivery models or future options for clinical practice or renal technology.

The strategies identified are summarised below.

### 6.1. Developments in Strategic Approach to Renal Disease

#### 6.1.1. UNITED KINGDOM

**National Service Framework Renal Service**

In 2001 the Kidney Alliance developed a framework for planning service delivery for end stage renal failure as a forerunner to the National Service Framework for renal services. The objective was to develop shared ownership of the problems and solutions through responsible investment and planned development. The framework proposed seven national service standards as the core objectives of a strategic plan for renal services:

1. Pre-dialysis: retarding progression and reducing the co-morbid burden in renal disease
2. Preparation for renal replacement therapy
3. Vascular and peritoneal access
4. Effective delivery: renal association standards and continuous quality improvement
5. Patient/carer experience
6. Conservative management of ESRF, palliative care and withdrawal from dialysis
7. Equity of provision.

In January 2004, the United Kingdom National Health Service released the National Service Framework for Renal Services that aims to raise standards, reduce variations in services, and improve health care for kidney patients. This responded to the Kidney Alliance framework and identifies four distinct sections, each relating to a major area of renal care:

- Effective delivery of dialysis
- Transplantation
- Primary prevention and pre-dialysis
- Alternative models of care

**Part One : Dialysis and Transplantation** sets five standards and identifies 30 areas of good practice which will help the NHS and its partners to:

- Manage demand for renal services
- Increase the fairness of access to these services
- Improve choice and quality in dialysis and kidney transplant services

**Part Two: Prevention and End of Life Care** has yet to be published.

**Transplantation Strategy**

England developed a strategy for transplantation in 2003, Saving Lives, Valuing Donors. A Transplant Framework for England and standards for transplantation are included in Part One of the National
Service Framework for Renal Services\textsuperscript{36}. The strategy sets out key aims for organ and tissue transplantation over the next ten years and identifies good practice to help others.

The UK government has invested significant funding in the NHS since 2001 to support initiatives to boost organ donation rates. These initiatives included:

- Donor liaison nurses working with staff in critical care units to agree local procedures for identifying possible donors and how to approach and support the relatives of donors;
- Living donor co-ordinators appointed to work with families considering the possibility of donating a kidney;
- Regional transplant co-ordinators at the rate on one co-ordinator per million population;
- NHS trusts funded to increase the number of organs from non-heartbeating donor programmes;
- Implementation of a donor audit in all critical care units to identify the number of potential donors and the reasons preventing them from becoming donors;
- Ongoing raising awareness among NHS staff of the desirability of organ donation.

In addition:

- The National Institute for Clinical Excellence (NICE) launched an interventional procedures programme in February 2003. Under the programme, clinicians are required to submit details of any new interventional procedure to NICE as part of their trust’s clinical governance regime.
- NICE appraisal to establish the clinical effectiveness and cost-effectiveness of immunosuppressive therapies for renal transplantation.

6.1.2. IRELAND

The Department of Health, Social Services and Public Safety in Ireland published a Renal Services Review in 2002\textsuperscript{37}. This is a comprehensive review that outlines recommendations in relation to:

**Prevention**

- Introduction of GFR estimates on routine clinical chemistry results;
- Development of guidelines for effective early detection and management of renal disease;
- Annual diabetes assessments to include microalbuminuria, proteinuria and serum creatinine. Regional audits of diabetes management.
- Availability of erythropoietin to treat anaemia of chronic renal failure in pre-dialysis patients to improve well-being and reduce cardiovascular morbidity.

**Facilities**

- Additional haemodialysis units recommended;
- Encourage increased use of peritoneal dialysis;
- Inpatient services should collocate renal inpatient beds;
- Development of a home haemodialysis programme.

**Quality of Care**

- Transport funding to be managed by each renal unit and have dedicated administrative resource.

**Renal Surgical Services**

- Expansion of consultant surgical capacity;
- Co-ordinator posts be established to arrange surgical access procedures and manage a clinical database for renal failure surgery;
- Increase in transplant coordinators and changes to funding arrangements for these posts.

**Acute Renal Failure**
- Identified inpatient beds with consultant cover at the existing renal units and backup arrangements with the regional unit.
- Development of guidelines for early identification and management of acute renal failure/Multiple Organ Dysfunction Syndrome for general ward use.
- Formal liaison arrangements for care of patients with acute renal failure in intensive care units between intensive care specialists and nephrologists.
- Regular audit of the management and outcome of acute renal failure patients.

**Paediatric Renal Services**
- Dedicated inpatient area for immuno-compromised renal patients
- Appointment of additional paediatric nephrologist; nursing staff, psychologist services and dietician.

**Staffing Implications**
- Increase in staffing numbers in line with recommendations.

Consultation on this review was undertaken in 2003, no final report has been made available at the time of publishing this document.

6.1.3. **UNITED STATES**

The United States has included Chronic Kidney Disease as one of the ‘Healthy People 2010 Objectives’\(^{38}\). The objectives are:

1. Decrease ESRD incidence rates;
2. Decrease cardiovascular mortality in ESRD patients
3. Increase pre-ESRD preparations to decrease ESRD-related morbidity
4. Decrease racial and gender disparities in kidney transplantation rates
5. Increase periodic microalbuminuria screening in persons with diabetes
6. Increase treatment to preserve renal function in persons with hypertension
7. Optimize blood pressure control in persons with renal disease
8. Increase counseling about renal risk factors

No specific national or state strategies to achieve these objectives have been identified.

6.1.4. **AUSTRALIA**

There is no Australian national or individual state strategy for renal services. The Department of Human Services in Victoria has commenced a project to develop a suitable service delivery model for Maintenance Dialysis services within Victoria.

The key objectives of the project are to:
- Identify the key issues for the provision of maintenance dialysis services;
- Review the level and usage of maintenance dialysis services, including levels of service, relationships between service providers and service demand;
- Interpret the projections for maintenance dialysis and the implications of these forecasts on service provision;
- Examine trends in clinical practice, new technology and approaches to care that have potential impact on future demand for services;
- Identify and address gaps in maintenance dialysis service provision and make recommendations for service development;
- Examine the relationships between hub and satellite services.

The result of the first stage of this project, situation analysis, was published in April 2004 and observations identified include:

- Support to continue a hub and spoke model service delivery framework;
- A need to explore mechanisms for state-wide forward planning, including estimating future demand;
- Concerns regarding the lack of capital funding available for machine and equipment replacement;
- Current and future workforce issues.

The final report due in August 2004 was not available at the time of publishing this document.
7. **APPENDICES**

2. Renal Medicine - Referral Guidelines
5. Ministry of Health Response to request of status of the Human Tissue Review
6. Ministry of Health Review of the Regulation of Human Tissue and Tissue-based Therapies: Submissions Summary - Excerpts from the document relating to Maori and Pacific Peoples submissions on organ and tissue donation
7. AMWAC Recommendations for a Specialist Nephrology Service
8. Glossary
7.1. Appendix One - Guidelines for the Safe Practice of Dialysis in New Zealand: Issues in Nephrology Relevant to Standards of Practice

Access To Renal Services

For people irrespective of age, ethnic background and locality to quality renal replacement therapy.

Entitlement to early referral to Renal Services (in line with the National Referral Guidelines for Renal Medicine) for the diagnosis and management of renal disease, treatment to delay the progression of chronic progressive renal failure and timely preparation for renal replacement therapy if appropriate. Access for patients to:

- patients accepted for renal replacement therapy to the full range of modalities of dialysis provided by qualified, credentialed staff under the direction of a nephrologist
- specialist nephrologist
- renal transplantation if meets established national eligibility criteria
- vascular intervention (surgical and radiological) and PD surgery as required
- appropriate pharmaceuticals for the management of his/her condition
- allied health support.

Requirements for a safe good quality Renal Replacement Service

- Satisfactory protocols for prescription of dialysis treatment.
- Protocols to minimise the frequency of access complications in PD and haemodialysis patients.
- Achievement of target values, which relate to patient outcome (e.g. haemoglobin, phosphate, parathyroid hormone).
- Defined lines of accountability and responsibility within dialysis services
- Standards for the maintenance of safe water quality for haemodialysis
- Environmental, power and technical guidelines for dialysis services

Referral for Renal Replacement Therapy:

All patients who might benefit from renal replacement therapy should be referred to a Nephrologist well before renal replacement therapy is required (GFR>30 mls/min).

A. Audit Criteria:

1. Eighty per cent of all patients accepted for renal replacement therapy should have been referred at least 3 months prior to commencement of dialysis and more than 60 per cent of patients referred for renal replacement therapy should have been referred at least 6 months prior to the need for dialysis.

2. Preparation, education and planning for dialysis should be completed for 100 per cent of patients requiring RRT. This would include the following:

   2.1. An educational process for patients
   2.2. The opportunity to choose RRT in discussion with a clinician
   2.3. Placement of permanent access in a timely manner to allow for its availability at the time of first commencement of dialysis.

3. Satisfactory monitoring of patients during the pre dialysis phase in line with accepted guidelines established by CARI and DOQI.
Haemodialysis:

1. All DHBs with a haemodialysis service must explicitly provide for both independent (self-care/home) and dependent (assisted care/in-centre) haemodialysis modalities. Independent modalities are defined as: - those where the patient undertakes all (or almost all) of the haemodialysis procedure. This can be provided in a haemodialysis unit (self care) or in the patient’s residence (home).

2. Dependent modalities are defined as: - those where most or all of the dialysis procedure is performed for the patient by a qualified dialysis nurse or technician. This can be provided in a haemodialysis unit (in-centre) or in the patient’s residence or a satellite centre (assisted care).

3. All haemodialysis providers should be able to offer treatments on schedules other than 3 times a week when it is clinically evident that more frequent haemodialysis regimens will benefit the patient.

4. All organisations providing haemodialysis must also provide or have readily available access to experienced vascular surgery and interventional radiology services for the routine emergency treatment of patients’ haemodialysis angio access complications.

Equipment should be maintained to manufacturers standards.

1. The water quality and testing regimen should confirm to European/AAMI water for dialysis Guidelines.

2. All organisations providing haemodialysis must include a vocationally registered nephrologist

3. Nurses and technicians should become certified in dialysis (certified dialysis practitioners CDP) as defined by the New Zealand Board of Dialysis Practice and non-certified practitioners must undertake clinical duties under the direction of the CDP. There should be no more than 2 training patients or 3 totally dependent patients, or 6 totally independent patients per dialysis practitioner.

Appendix - Definitions

Satellite Dialysis Units:

It is acknowledged that these are separate from base units. Some of them are a satellite for geographical reasons and some of them are a satellite in order to provide a more independent form of dialysis to centre dialysis, essentially in the northern main centres.

Home Dialysis:

As in most countries home haemodialysis is slowly reducing in terms of the percentage of dialysis patients placed on this therapy. It remains possibly the best therapy in terms of providing optimal independence and rehabilitation. Efforts need to occur in NZ to reverse this trend.

Peritoneal Dialysis

The Provision of a Peritoneal Dialysis Service

That all patients in New Zealand have access to a satisfactory peritoneal dialysis programme, which provides safe therapy for patients.

Audit standards to include: -

1. Staffing: Nephrology accountability; nursing staff to patient ratio one FTE to 25 patients with consideration given for geographical variations; social worker minimum one to a hundred patients; dietician minimum one to a hundred patients.

2. That PD standards and protocols are utilised based on internationally recognised guidelines and include the following: -

   Exit site management; peritonitis management and peritoneal dialysis exchange procedure protocols.

3. That an acute haemodialysis service can be easily accessed to support patients who may need interim haemodialysis.

4. That patient monitoring is undertaken, based on internationally recognised guidelines, which include the following: -
Adequacy as per CARI guidelines, PET as per CARI guidelines, blood testing: monthly as per CARI guidelines, nephrology clinic follow up 3-6 monthly and home visiting at least six monthly.

5. Dialysis fluids and systems: - all peritoneal dialysis services should have access to automated PD, polyglucose and biocompatible PD solutions. Allocation of these solutions to patients will depend on funding. Protocols for access should be in place.

6. A satisfactory on call system must be provided that enables out of hours access to renal service nurse/medical staff for PD patients.

**Peritoneal Catheter Placement:**

Standard: That peritoneal dialysis catheter placement is undertaken in a timely manner (prior to requiring dialysis) to minimise complications.

1. The placement of peritoneal catheters should be undertaken by a credentialled surgeon/radiologist within 4 weeks of the patient’s name being placed on a surgical waiting list (audit standard – to occur in 80% of patients).

2. A satisfactory process for pre-operative/post operative management is in place as per internationally recognised guidelines.

3. Complications within the first month following catheter placement should be minimised (audit standard – less than 10% of patients spending 5 or more days in hospital during the first 30 days following catheter placement).

4. Early complications should be minimised (audit standard: – peritonitis <5%, early exit site infection <10%, catheter migration <10% and peritoneal leak <10% within the first 30 days following catheter placement)

**Transplantation**

That every patient on the RRT programme, following appropriate assessment, if medically suitable, is offered the opportunity of renal transplantation. This should occur once the patient’s native creatinine clearance has reduced less than 15mls per minute adjusted or as soon as possible after the establishment of dialysis.
## 7.2. Appendix Two – Renal Medicine Referral Guidelines

### National Referral Guidelines: Renal Medicine

<table>
<thead>
<tr>
<th>Clinical problems to be referred include</th>
<th>Investigations usually required</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Haematuria (see Investigation 6)</td>
<td>1. Urine microscopy culture &amp; sensitivity and dipstick (if possible fresh for dysmorphic red cells and casts)</td>
</tr>
<tr>
<td>• Nephritic syndrome (see Appendix 1)</td>
<td>2. Full blood count</td>
</tr>
<tr>
<td>• Proteinuria (see Investigation 5)</td>
<td>3. Plasma biochemistry: - Electrolytes - Albumin - Urea - Calcium - Glucose - Phosphate - Creatinine - Urate</td>
</tr>
<tr>
<td>• Nephrotic syndrome (see Appendix 2)</td>
<td>4. Renal ultrasound (if available within time frame)</td>
</tr>
<tr>
<td>• Acute renal failure</td>
<td>5. Quantitation of proteinuria:</td>
</tr>
<tr>
<td>• Chronic renal failure (see Appendix 3)</td>
<td>- Urine albumin / creatinine ratio (normal &lt;3.5)</td>
</tr>
<tr>
<td>• Hypertension (suspected renovascular or with renal disease or failure)</td>
<td>- 24-hour urine protein or albumin (and creatinine clearance)</td>
</tr>
<tr>
<td>• Urinary infection (complicated - recurrent)</td>
<td>N.B. Microalbuminuria relevant to diabetes - refer diabetic service</td>
</tr>
<tr>
<td>• Abnormal renal structure (scarred or cystic kidneys)</td>
<td>- If &lt;1 g check if postural (benign), i.e. disappears on EMU &lt;0.3 gm</td>
</tr>
<tr>
<td>• Recurrent stone disease</td>
<td>- If &gt;0.5 g refer - urgency increased if associated with BP+, haematuria and/or renal impairment</td>
</tr>
<tr>
<td>• Symptoms or signs of vasculitis associated with above</td>
<td>7. Haematuria - if associated with BP+, proteinuria, renal impairment, age &lt;45 years or &gt;15% dysmophia. If none of above refer urology (check EMU cytology)</td>
</tr>
<tr>
<td>• Dialysis patients and kidney transplant patients (especially with reference to renal function, blood pressure and infection)</td>
<td>8. Sterile pyuria - check EMU cytology &amp; AFB - refer Urology</td>
</tr>
</tbody>
</table>

### Appendix 1.
Acute nephritic syndrome is haematuria, oedema and often hypertension due to proliferative glomerulonephritis. The salt and water retention is caused by a fall in GFR.

### Appendix 2.
The nephrotic syndrome is oedema, hypoalbuminaemia (<30 g/L) as a result of heavy proteinuria (>3 g/day). The cause is usually a non-proliferative GN.

### Appendix 3.
If creatinine is >0.15 mmol/L check creatinine clearance (by 24-hour urine or Cockcroft an Gault equation). Refer if creatinine clearance is <0.5 ml/sec for management of CRF.

### Cockcroft and Gault Equation:
For males: \[ \text{creatinine clearance} = \frac{[140 - \text{age}] \times \text{lean body weight (kg)}}{\text{creatinine (mmol/L)} \times 50,000} \]

For females: as above x 0.85

### NOTE:
- Patients with a milder degree of renal impairment should be referred if cause unknown and clinically indicated.
- Muscular individuals may have slightly raised serum creatinine but renal function by creatinine clearance may be confirmed as normal. Conversely, in those with low muscle mass a "normal" creatinine can be compatible with significant impaired function.

The Working Party on Standards and Audit resolved the following:

- It was not appropriate or feasible to attempt to develop a New Zealand equivalent of other practice guidelines such as CARI\(^b\) or K/DOQI\(^c\).
- International guidelines were of value to individual clinicians and departments but did not need to be formally adopted by the NRAB.
- It was not intended to produce a comprehensive best practice manual.
- It was agreed that development of workforce standards was necessary to support safe practice.
- Any data collection for audit should be simple and not duplicate other processes.
- Where possible data already being collected for other purposes (eg ANZDATA) should be used.
- Data obtained from audit should be relevant to patient care and inform any changes in the delivery of renal failure services.

The following recommendations are proposed:

**Type of Vascular Access (VA)**

- Centres must have access to appropriate vascular surgical services.
- An arteriovenous fistula (AVF) is the VA of choice.
- Preference should be given to formation of an AVF before placement of an arteriovenous graft (AVG) or permanent central venous catheter (CVC) (preferred order of provision).

**Proposed Audit Criteria**

- At least 70% of prevalent haemodialysis patients dialysing via AVF (ANZDATA).
- Less than 10% of patients dialysing for > 180 days using a CVC as their permanent access (ANZDATA). [Percentage of patients reported using CVCs in two successive reports.]

**Vascular Access at commencement of Haemodialysis**

- New haemodialysis patients should optimally have a functioning AVF or AVG at commencement of dialysis.
- Patients should be referred for vascular access formation when the creatinine clearance is <25mls/min or within 6 months of anticipated need for dialysis.

**Proposed Audit Criteria**

- More than 50% of incident patients commencing dialysis with functioning AVF and AVG (ANZDATA).
- More than 80% of non-late referrals commencing dialysis with a functioning arteriovenous fistula or graft (ANZDATA).
- Less than 20% of patients on vascular surgery waiting list greater than 2 months from date of referral (DHB).
- Estimated creatinine clearance at referral for first vascular access formation (Renal Units).

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\(^b\) Cari - Caring for Australian's with renal impairment

\(^c\) The Kidney Disease Outcomes Quality Initiative or K/DOQI provides evidence-based clinical practice guidelines developed by volunteer physicians and health care providers for all stages of chronic kidney disease and related complications, from diagnosis to monitoring and management. K/DOQI is based in the United States of America.
Central Venous Catheters (CVC)

- If it is anticipated that a CVC will be required for more than 3 weeks a tunnelled cuffed catheter is preferable to a non-tunnelled line.
- Placement should ideally be with ultrasound or fluoroscopy guidance.

Proposed Audit Criteria

- Incidence of <4 episodes of CVC blood stream infection per 1000 catheter days (hospital acquired blood stream infection reporting via MOH).

APD

- Automated Peritoneal Dialysis (APD) should be available as an alternative to Continuous Ambulatory Peritoneal Dialysis (CAPD) for patients with inadequate solute clearances or ultrafiltration failure (high transporter membrane type) on CAPD or for significant psychosocial reasons.

Proposed Audit Criteria

- Percentage of total PD patients on APD (ANZDATA).
- New peritoneal dialysis patients should have a peritoneal dialysis catheter placed 3-4 weeks prior to requiring dialysis.
- Centres must have access to appropriate Surgical and/or Radiological services for catheter implantation.

Proposed Audit Criteria

- Less than 20% of patients requiring interim haemodialysis via a temporary CVC (ANZDATA).
- More than 80% of catheters functioning at 1 year (PD Registry)
- Icodextrin peritoneal dialysate should be available for use when clinically indicated.

Proposed Audit Criteria

- Percentage of total PD patients using Icodextrin (PD Registry)

Peritonitis

- Units must have policies and procedures to minimize the rate of peritonitis on APD/CAPD.

Proposed Audit Criteria

- Peritonitis rates (NZ PD Registry).
### 7.4. Appendix Four – Waiting List Criteria for Renal Transplantation

**Clinical Priority Assessment Criteria**

RENAL MEDICINE - Waiting List Criteria for Renal Transplantation

Based on previous consensus agreement between NZ Renal Physicians and guidelines developed by the American Society of Transplant Physicians.

In general there should be greater than an 80% chance of two-year survival from all causes

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age:</strong></td>
<td>Graft and patient survival is reduced with increasing age; however, it is difficult to nominate an absolute cut off limit. The above guideline appears acceptable to the New Zealand renal community.</td>
</tr>
<tr>
<td>• No absolute age limit. Extent of co-morbidity more important. Relative contra-indication if age greater than 65 years and such recipients would require excellent general health.</td>
<td></td>
</tr>
<tr>
<td><strong>Obesity:</strong></td>
<td>There is conflicting evidence as to the effect of obesity on graft function. Most studies show a negative effect, predominantly by increased cardiovascular morbidity in obese patients. Overseas studies recommend a body mass index less than 30. A level of 35 is more acceptable to New Zealand physicians.</td>
</tr>
<tr>
<td>• Patients will have a body mass index less than 35.</td>
<td></td>
</tr>
<tr>
<td><strong>Cancer:</strong></td>
<td>Most solid organ tumours will recur within two years if metastatic. Exceptions are breast and colon where there is a higher recurrence rate between two and five years' follow-up; melanoma is similar. There needs to be some flexibility in the approach to cancer as carcinoma in-situ and less aggressive forms of cancer will require a shorter disease-free interval. Advice from surgical and oncological colleagues needs to be heeded.</td>
</tr>
<tr>
<td>• Solid organ tumours: disease-free interval at least two years.</td>
<td>The presence of hepatitis B carrier status confers a worse prognosis in a transplant patient compared to transplant recipients who are hepatitis B immune or to hepatitis B carriers who remain on dialysis. Higher risk is conferred by e antigen positivity, active viraemia and the presence of chronic active hepatitis. The absolute risk of patients who remain carriers without these worse prognostic features has not been quantified. Patients need to be fully informed of their potential risk if they are placed on the transplant list. The vast majority of patients who are positive for hepatitis C antibody continue to have active viral replication. When transplanted, such patients have an increased risk of chronic liver disease and death from liver failure compared to patients who are HCV negative. However, long-term studies thus far have not shown reduced patient or graft survival in transplant recipients who are HCV positive. The risk of liver disease in HCV positive patients who remain on dialysis has not been widely compared to HCV positive transplant recipients, but data to hand suggest that patients have improved survival once transplanted. It would therefore seem reasonable to exclude only those patients who have abnormal liver function and show evidence of chronic active</td>
</tr>
<tr>
<td><strong>Exceptions:</strong></td>
<td></td>
</tr>
<tr>
<td>• Breast and colon: disease-free interval - five years.</td>
<td></td>
</tr>
<tr>
<td>• Melanoma: disease-free interval - five years.</td>
<td></td>
</tr>
<tr>
<td>• Other skin cancer: disease-free interval - at the discretion of the renal physician.</td>
<td></td>
</tr>
<tr>
<td>• Renal carcinoma associated with acquired cystic disease: no disease-free interval provided there is complete histologic removal.</td>
<td></td>
</tr>
<tr>
<td><strong>Liver disease secondary to viral hepatitis:</strong></td>
<td></td>
</tr>
<tr>
<td>• All patients will have hepatitis B and C serology.</td>
<td></td>
</tr>
<tr>
<td>• If HB surface antigen positive, then patients will undergo: HBV PCR, Hbe antigen status, full liver function tests and liver biopsy. Patients with active HB viral replication, Hbe antigen positivity or chronic active hepatitis on liver biopsy will be excluded from transplantation.</td>
<td></td>
</tr>
<tr>
<td>• If positive for HCV antibody, then patients will undergo: HCV PCR, full liver function tests and liver biopsy. Patients with evidence of chronic active hepatitis will be excluded from transplantation.</td>
<td></td>
</tr>
</tbody>
</table>
hepatitis on biopsy. Again if accepted onto the transplant list, patients need to be fully informed of their potential risk.

Cardiovascular risk:

- Patients symptomatic of coronary artery disease or with a past history of coronary artery disease will proceed directly to coronary angiography.
- All diabetic patients will undergo stress testing (either standard exercise stress test, thallium stress test or dobutamine stress echo). If possible diabetics older than 45 should proceed directly to angiography.
- Patients older than 60 years will undergo stress testing.
- Other high-risk patients will undergo stress testing. Potential risk factors: continued smoking, positive family history, evidence of vascular disease elsewhere, hyperlipidaemia, abnormal ECG apart from LVH.
- Patients with a positive stress test will proceed to coronary angiography.
- Patients with greater than two vessel disease on angiography will require revascularisation prior to acceptance onto the transplant list.
- Diabetic patients with any degree of significant coronary disease will require revascularisation prior to acceptance onto the transplant list.
- Dialysis patients with symptoms or signs suggestive of congestive cardiac failure or valvular heart disease will undergo 2D transthoracic echocardiography. Patients with significant valvular disease will be excluded from transplantation until surgical correction. Patients with significantly reduced left ventricular function (ejection fraction less than 30% or reduced fractional shortening) will proceed to coronary angiography to exclude significant coronary artery disease.

Cardiovascular morbidity and mortality remain a major post-operative complication of transplantation and the leading cause of death in transplant recipients. Patients at highest risk are those with diabetes or multiple risk factors and such patients should be screened for coronary artery disease. Diabetic patients in particular may have significant coronary artery disease yet remain asymptomatic. Diabetic patients with any degree of significant coronary artery disease have been shown to have improved outcome following revascularisation compared to ongoing medical treatment. In non-diabetic patients this has not been shown and it is reasonable to only exclude patients with more significant coronary artery disease. The various screening techniques have similar efficacy and the choice should be determined by availability and expertise within the individual centre. Reduced left ventricular function is a predictor of poor outcome. Coronary artery disease may be the underlying cause and should be dealt with appropriately prior to transplantation. Uraemic cardiomyopathy in the absence of coronary artery disease may be improved following transplantation and decisions on such patients will need to be made on an individual basis in concert with cardiological opinion.

The above lists the minimal requirements for acceptance of a patient with end-stage renal disease onto the national cadaveric transplant waiting list. There are numerous other considerations such as the activity of renal disease, possibility of active infection, other systemic disease (i.e. respiratory, gastrointestinal), the presence of cerebrovascular or peripheral vascular disease, etc. It would be almost impossible to integrate all these considerations into a nationally agreed criteria list. These should be taken into account by the renal physician on an individual basis before determining suitability for transplantation. The American Transplant Physicians Guidelines cover these considerations in full.

Note: References in this Guideline are hyperlinked. Reference details may be accessed in the guideline from: http://www.electiveservices.govt.nz/index.cfm?fuseaction=careplans&fusesubaction=search_results&ENC=no
25 August 2004

The Ministry is currently analysing the submissions received on the Human Tissue Review’s Discussion Document. It is envisaged that a summary of the submissions, identifying major themes and suggesting principles for the development of legislation on the use human tissue, will be sent to the Minister of Health for her consideration in August 2004. The Ministry expects to be able to release the summary of the submissions with the Minister's approval. Your name has been added to the list of people who, pending Ministerial approval, will receive this document.

The Ministry will then begin a process of developing policy recommendations for the Minister. The recommendations will be informed by the submissions to the Review and by consultation with relevant government agencies (for example, the Land Transport Safety Authority). This process may also be informed by advice from sector reference groups made up of key stakeholders from the human tissue sector. It is expected that this process will take until around September 2004.

Once policy recommendations have been decided upon, the Ministry will work with the Minister to write Cabinet papers communicating these recommendations. It is expected that these papers will be written during October 2004.

Once Cabinet has agreed on a policy direction, the Ministry will issue drafting instructions to the Parliamentary Counsel Office, who will draft legislation. The Ministry is aiming for legislation to be introduced to the House of Representatives before the end of this year.

The Human Tissue review includes consideration of the consent framework for organ donation and the role of the family. The Review also considers whether regulation of tissue-based therapies and a safety framework for whole organs should be formalised. The Review of the Regulation of Human Tissue and Tissue-based Therapies Discussion Document is available on the Ministry of Health website - www.moh.govt.nz, under ‘publications’. Any changes to the regulatory and consent frameworks will aim to improve safety and quality of tissue-based products and maximise the rates of organs available for transplantation.

You also ask whether marketing / publicity in relation to organ donation is planned. The Government response to a Health Select Committee report on a petition by Andy Tookey and others which requested that "the House take action to address the organ donation shortage in New Zealand" considered whether the Government should fund a public awareness campaign. The Government response stated that "the Government supports an ongoing public awareness campaign in principle. However before such a campaign commences the national organ donation agency needs to be established as it is envisaged that part of their responsibility will be to educate health professionals and provide information on organ donation to the public and the media. Any public awareness campaign needs to be based on sound evidence, cost effectiveness and be regularly reviewed."

The Ministry is in the process of setting up a national organ donation agency. It is expected that it will be established early next year.

The Government response to the Health Select Committee report on the petition by Andy Tookey also indicated that the Ministries of Social Development and Health would give consideration to the issue of welfare assistance for live organ donors. The Minister of Health announced last Friday that she is expecting Cabinet to make a decision on this in the coming weeks.

Gillian Durham
Deputy Director General Sector Policy
Sector Policy Directorate
Ministry of Health
Consultation with Māori – page 14

This section provides a general overview of issues that arose in consultation with Māori.

Some Māori were concerned that broader involvement with Māori in the consultation process was needed as the use of tissue is an important issue for Māori. It was suggested that further hui be held, and discussion papers from a Māori perspective be prepared. Another submitter noted that Māori have been involved in the work to date, but it was unclear how Māori would be involved in ongoing monitoring of tissue use.

**Informed consent**

Informed consent was an important issue for Māori. One submitter captured this theme in stating: "It is wrong to conceive of collecting human tissue as impacting only on the body for Māori. The body is an extension of many dimensions and is symbolic of atua and tipuna. Collection of tissue has implications beyond the physical dimension. Whakapapa is affected and the ‘body’ can never be separated from the spiritual in a Māori sense."

In general, Māori felt that informed consent must be gained for any use of tissue. General consent and the concept of ‘public good’ overriding ‘informed consent’ were problematic and potentially inconsistent with tikanga.

Participants stated that there was a need for informed consent to be explicit and to clearly identify the purpose for which donated tissue and/or organs would be used. It is important that Māori and whānau are provided with information before consent for tissue use is sought. Information needs to be in keeping with cultural rights and practices and Māori may wish to have detailed information about systems (e.g. for tracking tissue) that may not be of concern to other cultures.

In terms of giving consent, Māori noted that whakapapa and the potential of life from all human tissue, meant that recognition of both individuals and collectives was needed in the consent process.

In general it was felt that there are Māori-specific ethics and tikanga that need to be taken into account in any use of tissue.

**Organ and tissue donation for therapeutic use**

Organ donation was seen as an act with spiritual and cultural dimensions that need to be accommodated. In general, many Māori saw organs and other parts of the body as taonga. They are viewed as having been handed down through whakapapa and therefore are not the property of the individual.

Consultation did not clearly identify a preferred option for legislation for organ and tissue donation for therapeutic use. However, the majority of participants considered presumed consent for organ donation to be unacceptable. The need for further discussion of organ and tissue donation within Māori communities was highlighted. It was strongly felt that Māori should lead any discussion about organ and tissue donation with Māori.

There was support for early discussion about organ and tissue donation to avoid difficulty if the situation ever arose, as discussion at the time someone was dying is very difficult. The importance of cultural beliefs and whānau involvement around the time of death was highlighted. So too was the need to balance any cultural concerns about donating with the life and death issues Māori face when an organ is needed by Māori.

There were mixed views on organ and tissue donation and the role of the individual versus the whānau/hapū/iwi in making the decision to be a donor. It was suggested that the legislation not be overly prescriptive around roles/rights for consent, retaining the ability for the whānau to have input. It would also be a mistake for legislation to assume what Māori do or don’t want in
Consultation with Pacific peoples – page 17

This section summarises the key issues that were raised during the Pacific focus group and in submissions that commented from a Pacific perspective.

An overarching theme was the importance of the provision of full information about the processes of organ and tissue donation, how organs and tissue would be used, and where tissues and organs for transplantation came from, so that people are able to give informed consent.

Another key theme was that an individual, whether alive or deceased, is a member of a family and thus there is a need for family involvement in decisions about donating tissues and organs. In this context it was noted that Pacific peoples don’t generally make their wishes about tissue use known as there is an assumption that family will know what is right, both individually and culturally, for their family member after death.

Consent for organ and tissue donation

Views from Pacific peoples emphasised the importance of informed consent to donation and the involvement of family members in the decision making process. In general, participants disagreed with presumed consent.

While the role of families in giving consent was seen as important, the potentially different views between older and younger Pacific peoples was also acknowledged. Young people may respect the wishes of older people but are more likely to be accepting of organ and tissue donation and more likely to want their individual wishes to be respected.

Participants felt that there was a need for discussion and increased awareness of organ donation within Pacific communities and families, before families are faced with the option of accepting or donating organs. However, it was also recognised that discussing organ donation within some Pacific families may be considered insensitive. It may be seen as pre-empting and anticipating death, rather than focussing on healing.

Within Pacific communities, there is a desire for the body of the deceased person to be intact for burial, this is connected with the practice of Pacific families dressing and preparing the deceased for burial.
7.7. Appendix Seven - AMWAC Recommendations for a Specialist Service in Nephrology

Table B72: Definition of an acceptable specialist service in Nephrology

<table>
<thead>
<tr>
<th>The medical management of patients with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>■ Complicated hypertension</td>
</tr>
<tr>
<td>■ All forms of acute and chronic renal disease. Optimal management of some of these diseases requires techniques, such as plasma exchange, that are only currently found in metropolitan teaching hospitals acute and chronic renal failure requiring dialysis. Dialysis for acute renal failure can be given as continuous therapy, in most hospitals now in conjunction with intensive care specialists. Dialysis for chronic renal failure is a complicated area, and may be given as peritoneal dialysis, or haemodialysis situated at home, in a satellite unit or in hospital renal transplantation - by necessity only in a limited number of urban hospitals, with nephrologists in other sites also involved in long-term supervision of these patients.</td>
</tr>
</tbody>
</table>

An acceptable nephrology service will vary considerably depending on whether it is urban or rural, and affiliated with a dialysis/transplant unit or not. Therefore, a rural practice requires strong affiliation with a metropolitan unit. Because of the tertiary nature of much nephrology, patients in a rural setting are disadvantaged.

Table B73: Population catchment required for a viable specialist service in Nephrology

<table>
<thead>
<tr>
<th>Resident service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban practice: 100,000-120,000</td>
</tr>
<tr>
<td>Rural practice major rural centre: 150,000-200,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Regular outreach service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural service close to an urban centre: 10,000- 15,000</td>
</tr>
<tr>
<td>Rural service remote from an urban centre: 5,000- 10,000</td>
</tr>
</tbody>
</table>

A rural area in close proximity to a large urban centre, or remote from a major urban centre is unlikely to sustain a nephrology practice. A nephrologist working in a major rural centre remote from a major urban centre is unlikely to practice pure nephrology (ie., will work as a general physician as well). Paediatric nephrology practice is only sustainable in capital cities.

The total number of nephrology consultants in Australia (approximately 140) is appropriate for the population, but the distribution across States is somewhat variable, as it is between rural and urban areas.

Recommendations have been developed for catchment populations for dialysis. For example, the population requirements for a home haemodialysis training unit were calculated at 1.3 million, a CAPD training unit 1.6 million, a hospital haemodialysis unit at a minimum of 800,000 and a self-care haemodialysis unit at a minimum of 100,000, or an optimum of 950,000. For a small unit one renal physician would suffice, but for a large unit at least two would be essential.

Factors decreasing population requirements

| Remoteness of practice from major urban centre |
| Absence of regular consultative service from major urban centre- either in person or by telemedicine increasing age of the population (the incidence of renal disease, especially renal failure requiring dialysis, increases significantly with age) |
| Greater proportion of Aborigines (the incidence of renal disease is much higher amongst the Aboriginal population) |
| Remoteness of patients from practice |

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Table B74: Infrastructure requirements for a sustainable resident specialist service in Nephrology

**Hospital facilities and equipment - urban and rural practice**

- Renal imaging - CAT scanner, ultrasound, radioisotopic scan, intravenous pyelography, angiography
- Access to acute dialysis - usually CVVHD in an ICU
- Access to chronic dialysis facilities, which may be situated in a satellite or hospital unit. Dialysis training is performed in only a limited number of units as per health department guidelines
- Access to plasma exchange (limited number of urban hospitals only)
- Access to renal transplantation (limited number of urban renal units only)
- Access to renal transplantation (limited number of urban renal units only)
- Ambulatory blood pressure monitoring
- Procedure room for renal biopsy, dialysis access
- Pathology services, including clinical biochemistry, haematology, anatomical pathology (light, immunofluorescence and electron microscopy), immunology and microbiology
- Hospital beds

**Skilled nursing/allied health and ancillary staff - urban and rural practice**

These requirements are determined by the nature of the service to be provided rather than the location (especially dialysis)

- Resident medical staff - urban and rural hospitals
- Trained nursing staff for haemodialysis, CAPD (transplantation where appropriate) and outreach nursing
- Biomedical engineer (dialysis machine maintenance)
- Dietician/social worker/access to interpreter services and an occupational therapy service is desirable

**Other services required in close proximity**

- Renal imaging and pathology services as outlined above under hospital facilities
- Urological services
- Dialysis (peritoneal and haemo) access surgery (usually by referral to urban centre)
- Other major medical specialties, such as cardiology (due to the high prevalence of intercurrent diseases amongst renal patients)
- Established and easy tertiary referral links

**Surgery/office facilities and equipment**

- Basic examination equipment (sphygmomanometer, ophthalmoscope)
- Microscope and centrifuge for urine microscopy
- Phone/fax and secretary
- An increasing number of practices provide ambulatory blood pressure monitoring and (in some cases) renal ultrasound

Table B75: Infrastructure requirements for a sustainable outreach service in Nephrology

- Safe travel by plane to remote areas
- A room for communication (phone/dictation)
- Basic pathology
- Dietitian/outreach nurse
- Consulting room with basic examination equipment
- Microscope and centrifuge
- Access to basic pathology (biochemistry)
<table>
<thead>
<tr>
<th>Level 0-2</th>
<th>- as for general medicine</th>
</tr>
</thead>
</table>
| Level 3      | - as for general medicine Level 3 plus renal patients managed by general physician  
|              | - may have self care dialysis centre with patients under the care of larger renal unit  
|              | - Level 2 anaesthetics and operating suite services  
|              | - Level 3 pathology, pharmacy, x-ray, ICU and CCU |
| Level 4      | - as Level 3 with management of patients by general physician with interest in nephrology  
|              | - nephrologist consultation available  
|              | - has medical officer on site 24 hours  
|              | - has nursing unit manager and experienced registered nurses  
|              | - has self care renal dialysis centre with formal link to larger renal unit  
|              | - Level 3 operating suite services  
|              | - Level 4 pathology, pharmacy, x-ray, anaesthetics, ICU and CCU |
| Level 5      | - as Level 4 plus medical registrar on call 24 hours  
|              | - specialist renal physician  
|              | - part-time unit director or coordinator  
|              | - all types of dialysis available including treatment of patients requiring haemodialysis (2 or more patients treated on average at any one time)  
|              | - renal biopsies performed  
|              | - registered nursing at or above 6 hours/patient/day (1:4) desirable  
|              | - access to clinical nurse consultant is desirable  
|              | - may have teaching and research role  
|              | - Level 4 anaesthetics, CCU and operating suite services  
|              | - Level 5 pathology, pharmacy, x-ray, nuclear medicine and ICU |
| Level 6      | - as Level 5 plus medical registrar on site 24 hours  
|              | - has nephrology department  
|              | - renal transplantation available and coordinated by full time renal unit director  
|              | - as nephrology registrar  
|              | - experienced registered nurses on most shifts  
|              | - has teaching and research role  
|              | - Level 4 CCU and operating suite services  
|              | - Level 5 pharmacy, nuclear medicine and anaesthetics  
|              | - Level 6 pathology, x-ray and ICU |
7.8. Appendix Seven: Glossary

ACE inhibitor – Angiotensin Converting Enzyme inhibitor. A class of drug that reduces blood pressure and improve heart function in heart failure.

Acute renal failure (ARF) – rapid deterioration in kidney function (days to weeks) that is potentially reversible. A proportion of cases are haemodialysis-dependent and spend prolonged periods in hospital often in an Intensive Care Unit setting.

Anaemia – A shortage of properly functioning red blood cells. Haemoglobin in red blood cells carries oxygen around the body, and anaemia causes tiredness and shortage of breath. Normal kidneys produce erythropoietin, a hormone which stimulates red blood cell production.

Chronic renal failure (CRF) – slowly progressive kidney failure (months to years) that may be managed by GP's in primary care. Earlier referral can delay the need for Renal Replacement Therapy.

Creatinine – A waste product of muscle metabolism that is removed via the kidneys. The level of creatinine in the blood (serum or plasma) is commonly used to assess kidney damage.

End stage renal disease (ESRD) or end stage renal failure (ESRF) – an irreversible loss of renal function that is fatal if not treated.

Haemodialysis (HD) - blood purification through haemodialysis most commonly involves treatments that lasts 3-5 hours three times per week). The length and kind of treatment chosen is individual and depends on the patient’s body size, residual kidney function and blood levels of toxins.

Haemodialysis occurs in an artificial kidney. Two fluids – the blood and the dialysis fluid – flow in opposite directions through separate compartments in the artificial kidney. These compartments are separated by a thin membrane, with microscopic holes, which allows diffusion of toxic substances from the blood into the waste dialysis fluid. In addition excess body fluid can be removed during dialysis. To be able to clean the blood there has to be access to the body's circulation.

There are different types of blood access:
- A fistula is made by surgically connecting two vessels, a vein and an artery, usually in an arm. This results in an enlarged vein. After surgery the fistula needs some time to become large and strong enough for needle insertion.
- A graft is made when an artery and vein are surgically connected using a piece of hollow tubing of synthetic material. This kind of access also needs some time to mature.
- A permacath is an external access, a catheter (hollow tube) that is inserted into a large vein through the neck or upper chest. It can be used immediately.

The best type of access is a fistula, as it lasts longer than other devices and is associated with better quality of dialysis and less infection.

Incidence – The number of people in a population who develop a specified condition, usually in a one-year period. For treatment, the number of new (incident cases).

Non-heartbeating donations – Normally where a patient has died in hospital and organ donation follows and organs are preserved shortly after death and retrieved quickly to enable transplantation.

Peritoneal dialysis (CAPD or APD)- home-based dialysis treatment. In a peritoneal dialysis (PD) treatment, the peritoneal membrane acts as the artificial kidney. The peritoneal membrane is a sac that lines the walls of the abdominal cavity and surrounds the abdominal organs. It is also rich in blood vessels.

Access is via a catheter which is a flexible hollow tube surgically placed in the lower abdomen that is needed for this form of dialysis. Through this catheter, normally two litres of fluid are instilled into the abdominal cavity. The body’s waste products move from the blood into the fluid, through the peritoneal membrane. After a certain time the fluid is drained and replaced by new, fresh fluid. In contrast to haemodialysis, this is most often a continuous therapy, i.e. the patient is carrying dialysis fluid in the abdominal cavity at all times – continuous ambulatory peritoneal dialysis (CAPD).
Automated variations of peritoneal dialysis (APD) are suitable for some individuals. Peritoneal Dialysis is mainly a self-care treatment and is usually performed by the patient him/herself at home.

Pre-dialysis – advanced chronic renal failure state requiring multidisciplinary input to prepare for renal replacement therapy.

Prevalence – The number of people in a population who have a given condition, in a specified time period. For treatment, the number of new (incident cases) plus the number of existing cases.

Renal replacement therapy (RRT) - partial restoration of some components of kidney function by dialysis or more complete replacement of function by kidney transplantation.

Transplantation – A donated kidney is inserted into the recipient's lower abdomen, and the blood vessels and ureter are connected to the recipient's blood vessels and bladder. Immunosuppressive medicines are given to prevent rejection of the kidney.
8. REFERENCES


