Prevention and Treatment Options for Renal Disease in the Northern Territory
(with particular reference to the Barkly Region)

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and
Department of Health and Community Services
Contents

Glossary of Terms ................................................................................................................. vi
Acronyms ............................................................................................................................... vii
Executive Summary .............................................................................................................. viii
Conclusions ........................................................................................................................... x

1. Background .................................................................................................................. 1
   1.1. Introduction ............................................................................................................. 1
   1.2. Report methodology ............................................................................................... 1
   1.3. Reference Group ..................................................................................................... 2
   1.4. Acknowledgments .................................................................................................. 3

2. End Stage Renal Failure in the Northern Territory .................................................... 5
   2.1. Causes .................................................................................................................. 5
   2.2. Incidence and Prevalence ..................................................................................... 6
   2.3. Life Expectancy and uptake of services ............................................................... 8
   2.4 Projections ............................................................................................................. 8

3. Relocation- Social, Medical and Financial Costs ..................................................... 15
   3.1. Family and Community Issues ............................................................................. 15
   3.2. Tiwi Dialysis Centre - preliminary assessment .................................................. 16

4. Health Investments ....................................................................................................... 19
   4.1. Health Status of Northern Territory ................................................................. 19
   4.2. Co-morbidities and Renal Disease ....................................................................... 19
   4.3. Prevention, Screening and Intervention Programs ............................................. 19
   4.4. Linking ESRF Treatment with Prevention and Education .................................. 23

5. Improving Equity of Access ...................................................................................... 29
   5.1. National Standards in Renal Services ............................................................... 29
   5.2. NT Renal Services ............................................................................................... 30
   5.3. Barriers to Delivering Efficient Effective Services ............................................. 32
   5.4. NT Renal History ............................................................................................... 33

6. Funding of Services from Primary Health to Tertiary Services ................................ 37
   6.1. Primary Health .................................................................................................. 37
   6.2. Casemix .............................................................................................................. 39

7. Cost of Renal Failure Management .......................................................................... 41
   7.1. End Stage Renal Failure Expenditure ................................................................. 41
8. Modalities and Uptake ........................................................................................................ 45
  8.1. Transplantation ........................................................................................................... 45
  8.2. Haemodialysis ............................................................................................................ 46
  8.4. Peritoneal Dialysis ...................................................................................................... 48
  8.4. Client Training .......................................................................................................... 49

9. Options for Tennant Creek ............................................................................................. 51
  9.1. History ........................................................................................................................... 51
  9.2. Current Situation ......................................................................................................... 51
  9.3. Indigenous Support Services in Tennant Creek ......................................................... 54
  9.4. Considerations in providing local services ................................................................. 55
  9.5. Management and Funding Scenarios ......................................................................... 60

10. Bibliography .................................................................................................................. 67

11. Appendices .................................................................................................................... 73
  11.1 Expressions of Interest - Tennant Creek Renal Dialysis Facility - Baxter, Gambro and Fresenius ................................................................. 74
  11.2 Assessment of Manufacturers submissions for establishment of Tennant Creek Renal Services ................................................................. 104
List of Figures and Tables

Figure 1  Primary Renal Disease of New Clients for 1993 - 99
Figure 2  Incidence Rates of ESRF in Australia
Figure 3  Indigenous Incidence Rates of ESRF per State
Figure 4  Clients Receiving RRT in the Territory 1995-99
Figure 5  Haemodialysis Treatments between 1995 and 2000
Figure 6  MSHR Estimates of New Indigenous Cases versus Actual
Figure 7  Cumulative Estimates of New Indigenous Cases versus Actual
Figure 8  Dialysis Treatments of Two 2.5 year Periods
Figure 9  Estimations of Haemodialysis Clients in Central Australia
Figure 10  Deakin Report Projections of RRT in Central Australia
Figure 11  Method and Location of Dialysis by State
Figure 12  PHCAP Planning zones in Central Australian Region
Figure 13.1 Transplantation Rates
Figure 13.2 Client Survival Post Transplant
Figure 13.3 Transplant Graft Survival
Figure 14 Comparison of Modalities
Figure 15 Incidence of ESRF by ATSIC Region (1993-98)

Table 1  Causes of Renal Disease, Central Australia
Table 2  Projected New Aboriginal ESRF Cases for Next two 4 year Intervals
Table 3  Kidney Disease Prevention Programs
Table 3.1 Comparison of Kidney Disease Prevention Programs
Table 4  Top End Renal Services Flow Chart
Table 5  Central Australian Renal Services Flow Chart
Table 6  National and International Comparisons of Expenditure for RRT
Table 7  Staff to Client Ratios for Haemodialysis
Table 8  Staff to Client Ratios for Training
Table 9  State Comparisons of Service Locations in Australia
Glossary of Terms

Access
Refers to the creation of a fistula, insertion of a Tenckhoff catheter or subclavian catheter to enable dialysis to take place.

Buddy
Companion, usually spouse, who accompanies the client during dialysis and has also received training, enabling them to assist or deliver treatment as necessary.

Dialysis
Dialysis is the process of removing the body’s metabolic wastes and excess fluid that would normally be carried out by the kidneys. The two forms of dialysis are haemodialysis and peritoneal dialysis.

Donor
Refers to the host of the donating organ. Cadaver donor is from someone who has died and who has, or whose family has, agreed to donate their organs. Live or living related donor is usually from a family member agreeing to donate a kidney, though donors are no longer restricted to blood relations.

End Stage Renal Disease/Failure (ESRD/ESRF)
Irreversible damage with greater than 95% deterioration of renal function. Dialysis and transplantation are the accepted treatments for ESRF.

Exit Site
Area where the peritoneal catheter exits the abdomen. Potential site for infection if not kept clean and dry.

Fistula
The surgical joining of an artery and a vein, usually in the lower arm, to increase the arterial circulation through the superficial venous veins to make them larger and stronger. This allows easier access for needles in order to perform haemodialysis.

Haemodialysis (HD)
Involves pumping the blood through an external circuit and artificial kidney in order to filter out the waste products before the blood is returned to the body. People on dialysis attend treatment three times a week for a minimum of four hours per treatment.

Immunosuppressives
Specific medications given to suppress the body’s response to transplanted or foreign material.

Incidence
Number of new clients per year with a certain condition.

Limited Self-Care
Client is unable to carry out most of the haemodialysis treatment and requires skilled nursing/health worker intervention.

Microalbuminuria
A marker of early renal disease manifested as the ratio of albumin to creatinine in the urine to a level between 3.4g/mol and 34g/mol.

Minimal Care (Intermediate self-care)
Client can carry out most of the dialysis treatment independently but requires some supervision and assistance with needling or checking of fluid calculations entered into dialysis machine.

Overt albuminuria
Marker of renal disease manifested as the ratio of albumin to creatinine in the urine to a level greater than 34mg/mmol.

Peritoneal Dialysis (PD)
A form of dialysis that uses the peritoneal membrane in the abdomen as the filter to remove the wastes and excess fluid that would normally be removed by healthy kidneys. It involves inserting 2-3L of fluid into the abdomen via a surgically inserted tube, allowing it to dwell for a number of hours, before exchanging it via the same tube for fresh fluid. This needs to occur 4-5 times a day and in adults, tends to be an independent procedure. Peritoneal dialysis can also occur overnight by employing a machine to warm, deliver and drain the necessary fluid volume over a set number of hours. This is called automated peritoneal dialysis.

Prevalence
The number of people within a population with a certain condition.

Renal Insufficiency
A condition involving deterioration of renal function which may occur acutely or chronically.

Renal transplantation (Tx)
The process of removing a functioning kidney from a donor, (live or dead) and placing it in the body of an appropriate recipient. Transplantation is a treatment, not a cure, and it involves a person taking immunosuppressive medication for the rest of his or her life.

Self-care
Refers to the independence of a client in attending his or her own dialysis treatment without nursing supervision or intervention.

Stations/Ports/Chairs
Refers to the number of dialysis machines a facility can accommodate. Each machine can dialyse a maximum of four clients a week.

Tenckhoff Catheter
A permanent catheter inserted into the peritoneal cavity to enable peritoneal dialysis to be performed.
Acronyms

ACAC: Anyinginyi Congress Aboriginal Corporation
AHW: Aboriginal Health Worker
AMSANT: Aboriginal Medical Services Alliance of the Northern Territory
AN-DRG: Australian National Diagnosis Related Group
ANZDATA: Australia and New Zealand Dialysis and Transplant Registry
APD: Automated Peritoneal Dialysis
ASH: Alice Springs Hospital
ATSIC: Aboriginal and Torres Strait Islander Commission
CAPD: Continuous Ambulatory Peritoneal Dialysis
CNC: Clinical Nurse Consultant
CRF: Chronic Renal Failure
CRI: Chronic Renal Insufficiency
DRG: Diagnosis Related Group
HBG: Health Benefit Groups
HLA: Human Leukocyte Antigen
HRG: Health Resource Groups
MBS: Medicare Benefits Schedule
ICU: Intensive Care Unit
MSHR: Menzies School of Health Research
OATSIH: Office for Aboriginal and Torres Strait Islander Health
PBS: Pharmaceutical Benefits Schedule
PD: Peritoneal Dialysis
RAHW: Renal Trained Aboriginal Health Worker
RDH: Royal Darwin Hospital
RN: Registered Nurse
RRT: Renal Replacement Therapy, referring to haemodialysis, peritoneal dialysis and transplantation.
TERS: Top End Renal Services
THS: Territory Health Services (now the Department of Health and Community Services or DHCS)
Executive Summary

1. Renal Disease in the Northern Territory

Nationally, Aboriginal people are nearly four times more likely than non-Aboriginal people to have End Stage Renal Failure (ANZDATA 1999). The Northern Territory has the highest incidence, at ten times the national non-Aboriginal rate. Aboriginal people entering the Renal Replacement Therapy (RRT) program in the Northern Territory make up 85 per cent of the dialysis population. They are younger, predominantly women and they tend to have shorter treatment survival than their non-Aboriginal counterparts.

Remote regions in NT and nationally have the highest incidence of renal disease. More generally, there are demonstrated strong correlations between the high incidence of ESRF and such markers of socio-economic disadvantage as unemployment, house crowding, household income, education and low birth weight. The incidence of ESRF among Aboriginal people in the Tennant Creek region (Yapakurlangu) of the Aboriginal and Torres Strait Islander Commission is the highest in Australia, at almost 1300 cases per million people per year.

2. Socio-Economic Impacts of Renal Illness

More than 80 per cent of people in the NT who need dialysis are forced to relocate to an urban centre for treatment. People who undertake treatment away from their community suffer significant psychosocial and economic stress, which results in a dramatic decrease in quality of life. Extended visits to the home community during treatment compromise the success of treatments and may affect overall health, with more acute admissions, rising levels of severity of co-morbidities and decreased life expectancy.

The need to move to an urban centre for treatment may actually influence the significant number of Aboriginal people - variously estimated at between 15 and 30 per cent - who choose not to have dialysis. The individual family and community distress associated with both relocation for ESRF treatments and the excessive levels of death through renal disease will see continuing pressure from NT Indigenous communities for dialysis services closer to home.

The recent Tiwi Island experience of community-based dialysis demonstrated significant improvements in client health and reported wellbeing. After one year, a number of indicators of overall patient health improved, including:

- lower anti-hypertensive requirements
- increase in albumin levels
- increase in haemoglobin levels
- 100 per cent attendance at treatment sessions
- a decrease in acute admissions

Reports from Tiwi people themselves also suggested an increase in physical activity, improvement in diet and a greater willingness to participate in community life. In the Tiwi experience, there were savings after the establishment phase because of reduced staff-patient ratios.

3. National Trends in Service Provision

There is a trend in all States to decentralise renal services. A growing number of rural hospitals incorporate small dialysis units with appropriately trained and experienced staff. To provide accessible equitable services in a climate of restricted budgets and increasing numbers of renal clients, the renal plans of NSW, Queensland and WA rely on similarly-based strategies that include:

- decentralising services
- increasing transplantation rates
- providing incentives to increase home dialysis numbers.
There are plans to establish remote dialysis services in far North Queensland and at two locations in Northern Western Australia.

Nationally, the rising number of dependent clients being treated in satellite facilities has increased staffing requirements to the point where they now reflect staffing levels in the Northern Territory. The client profile and essential business of the Northern Territory services is, however, more complex than that of other states. The major satellite units (Nightcliff, Alice Springs) concurrently train clients as well as staff while also being routinely responsible for medically unstable clients.

4. Opportunities for Investing in Health and Renal Service Development

The excessive costs of renal disease - broadly economic as well as to family and community - justify special attention to treatment, both within the comprehensive primary health care approach preferred by Aboriginal Medical Services and within the Preventible Chronic Disease Strategy of DHCS. Treating people as close to home as practicable has demonstrated potential both to improve individual health and - under good management - to decrease costs in the relatively short term. Linking renal treatment services more directly to the community-based primary health care sector will offer more opportunities for renal health promotion, as well as for family and community involvement.

Future service provision, however, must be informed by the gathering of sound population and epidemiological data. Similarly, the excessive health costs warrant action to systematically evaluate strategies to improve both prevention and treatment programs. The initial costs of establishing decentralised services must be measured against improved health levels, increased quality of life and reduced resource allocations in the immediate and longer term. For a true assessment of resource allocation, the level of additional government and community services required to support relocated clients also needs to be fully evaluated.

5. Tennant Creek and Barkly Region - A Case Study Option.

The research carried out within this study indicates that Tennant Creek is well placed to manage locally based end-stage renal failure treatments. There is evidence of:

a) a network of robust Aboriginal community-controlled organisations with the capacity and experience to manage and support these services

b) a well-established comprehensive primary health care service (Anyinginyi Congress) with an emphasis on preventive approaches

c) under Julalikari Council, the established additional support services necessary to successfully maintain returning ESRF clients; including client transport, suitable accommodation, employment and home assistance, night patrol and other social services

d) well-developed intersectoral links between government and non-government agencies, including, importantly, between Anyinginyi Congress and the staff and management of the Tennant Creek Hospital and between these organisations and ATSIC.
Conclusions

There is potential to develop a Barkly chronic disease (renal) research program that is underpinned by additional research within the “social determinants of health” approach. This body of work would be applicable to other parts of rural and remote Australia.

1. This report concludes that a comprehensive health service addressing the management continuum of renal disease be established in Tennant Creek.

2. An approach to service delivery that locates renal replacement therapies within a comprehensive primary health care context as a specific strategy of prevention offers an opportunity for significant health services research, so the establishment and continuing operation of the service should be the subject of an intensive case study. The study would provide a basis for financial modelling, program evaluation and co-ordinated care in managing chronic disease.

3. To build on work already under way, particularly the Chronic Disease Register for the Barkly Mobile Unit, and to address the apparent deficiency in renal-related data throughout the region, the CRCATH should undertake a Barkly Renal Disease Prevention Study. This study would be an important step in developing an accurate picture of the prevalence of renal disease and current service capacity in the Barkly.

4. There should be a research study into the impact and effectiveness of the Enhanced Primary Health Care Package in a remote Primary Health Care setting, using Anyinginyi Congress as the model.

5. There should be a systematic investigation of the extent to which screening and/or intervention protocols for the major chronic diseases are available and applied in the Barkly region. This study should also cover the Renal Outreach Program.

6. The uptake of renal services in the NT also needs further study and past and current clients should be surveyed to determine:

   • why the rate of acceptance for transplant waiting lists for Indigenous clients in the 15-55 age group (the most likely to be transplanted) is approximately half that of the non-Indigenous group;

   • the levels of acceptance, refusal of treatment and withdrawal of treatment and the reasons for these;

   • the percentages of renal deaths that can be attributed to breaks in treatment caused by extended community visits; and

   • the similarities and differences between urban and remote RRT clients and the treatment modalities they choose.

7. The feasibility of producing renal education materials in the languages of the region should also be further investigated.
1. Background

1.1. Introduction

In January 2000, staff of the Cooperative Research Centre for Aboriginal and Tropical Health met with the Tennant Creek Renal Committee (TCRC)\(^1\) and proposed that an opportunity existed for collaboration on approaches to renal and other chronic disease in the region. The CRCATH offer had two components. It would:

1) provide additional resources to the TCRC to investigate the feasibility of establishing ESRF services in their region, which information THS undertook to use to inform its own decision-making\(^2\) about service provision

2) establish a longer-term collaboration in research to support community-based initiatives towards the prevention of not only renal disease but also the chronic conditions (diabetes, ischaemic heart disease, hypertension, and airways disease) that share a similar developmental pathway.

The CRCATH Board had approved this initiative on the basis that it provided "an opportunity for the CRC - through taking a case study approach - to establish and systematically study a 'best-practice' chronic disease prevention program within a specific regional community". The offer specifically proposed renal disease as a way of focussing systematic study\(^3\). Intense local community interest in dealing with renal disease in particular further enhanced the potential for effective collaborative work.

Stakeholders agreed that there would be little benefit in investing in end stage disease management without concurrently investing in prevention programs to reduce the demand for dialysis. Conversely, however, they also agreed that strengthening the links between local prevention activities and illness treatments would have an important role in community education.

CRCATH, through a working party that included the Chair of TCRC, local renal specialists and CRCATH staff (see 3.5), undertook the feasibility study. The working party have all spent time working in Tennant Creek, based at Anyinginyi Congress.

Ms Gill Gorham undertook a review of comparable national and international trends in renal disease management, in order to provide details of possible management options - including financial matters - and preliminary indications of avenues of prevention. Gill Gorham is usually the Clinical Nurse Consultant of the Nightcliff Renal Unit: she also supervised the establishment of the Tiwi Dialysis Unit, including running staff and patient training.

1.2. Report methodology

1. A literature search on renal management, including particular issues arising with Indigenous populations, was undertaken.

2. Health Departments in NSW, QLD, WA and NT were contacted to provide information on:
   - renal services costings, including costs of individual modalities
   - renal reviews and/or plans undertaken in the last five years
   - prevention, screening and intervention strategies.

3. Phone interviews were held with staff in charge of renal outreach services, home dialysis training units, satellite facilities in the major hospitals of each state and in smaller facilities dealing with the Indigenous population.

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\(^1\) The TCRC had formed to pursue the local communities long-standing request to have end stage renal failure services established in Tennant Creek. (see Carney 2000)

\(^2\) Letter from Korner (THS) to Barnes (CRCATH) January 1999.

\(^3\) Relevant papers establishing this project went to the December 1999, February 2000 CRCATH Board meetings.
4. Interviews were held with staff and clients at facilities used by people from Barkly Region communities, specifically at the Alice Springs Renal Unit, Anyinginyi Congress Health Clinic and Tennant Creek Hospital.

5. Phone interviews were held with THS staff about policy and financial matters, as well as chronic disease strategy implementation and assessment.

6. There was a field trip to Tennant Creek, including an inspection of existing facilities and discussions with local organisations.

7. Three private dialysis companies submitted an Expression of Interest for the management of a Tennant Creek Dialysis Facility along specified guidelines, including costings. - (see Appendices).

1.3. Reference Group

The Reference Group included people from the Barkly, Alice Springs, Territory Health Services (THS - now the Department of Health and Community Services or DHCS) and the Cooperative Research Centre for Aboriginal and Tropical Health (CRCATH).

**Barkly**

- David Morgan  General Manager, Anyinginyi Congress
- Ross Williams  Chairman, Julalikari Council
- Ray Anderson  Environmental Health Officer, DHCS
- Doris Cambell  Aboriginal Health Worker, Anyinginyi Congress
- Barb Shaw  Director of Nursing, Tennant Creek Hospital

**Darwin**

- Paul Lawton  Kidney Disease Research Program (KDRP)

**Alice Springs**

- Deborah Gration  Director of Nursing, Alice Springs Hospital (ASH)
- Danni Allen  Clinical Nurse Consultant, Flynn Drive Renal Unit
- Cherry Millar  Renal Outreach Clinical Nurse Consultant, Flynn Drive Renal Unit

**CRATH Working Party**

- Meshach Kirubakaran  Nephrologist, ASH
- Helen Carney  Locum GP (Anyinginyi)
- Randal Davis  Chair of Tennant Creek Renal Committee and Senior Medical Officer, Anyinginyi Congress
- Paul Snelling  Nephrologist, Top End Renal Services, DHCS
- Alan Cass  Nephrologist and Post Graduate Student, Menzies School of Health Research
- Cheryl Rae  Director, Health Gains Planning DHCS
- Peter Mc Donald  Head of Microbiology and Infectious Diseases, Flinders Medical Centre and CRCATH
- Jeannie Devitt  Aboriginal Medical Service Senior Research Fellow at CRCATH
- Gillian Gorham:  Project Officer CRCATH (Clinical Nurse Consultant Nightcliff Renal Unit)
1.4. Acknowledgements

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**Queensland**

Barbara Schmidt  
Barbara Schmidt and Associates

Thanks to the Nursing Staff in dialysis and home training from NSW, Qld, WA and SA who were willing to give their time so freely.
2. End Stage Renal Failure in the Northern Territory

2.1. Causes

Aboriginal people in Australia have an incidence rate of end stage renal failure (ESRF) almost four times greater than the non-Indigenous population (ANZDATA 1999). The Northern Territory has the highest incidence, at ten times the national non-aboriginal rate. Eighty-five percent of people undergoing dialysis are Aboriginal. They are younger, predominantly women and tend to have shorter treatment survival than their non-Aboriginal counterparts.

The causes of renal failure amongst Aboriginal people are complex and not yet fully understood. Much can be attributed to the social, economic and physical disadvantage of Aboriginal people that is manifested in poor living conditions, unhealthy lifestyles, inadequate nutrition, lack of community empowerment and inappropriate health services. All of these contribute to or fail to remedy the infectious, immunological, physiological and metabolic causes of renal disease (Catford et al, 1997).

End stage renal failure in Aboriginal people is mainly attributable to diabetes, glomerulonephritis and hypertension. Hypertension is, however, a concomitant factor of renal failure and not necessarily a cause, and is also a strong promoter of progression to ESRF because of other pathologies.

The following table identifies the main primary causes of ESRF in Indigenous Australians and compares them with causes for non-Indigenous Australians between 1993 and 1999 (ANZDATA 1999). It demonstrates the high incidence of diabetes and the difficulty in determining the cause of the disease in a significant number of Indigenous people with ESRF.

![Primary Renal Disease of New Clients for '93- '99](Image)

Figure 1. Source ANZDATA and Cass 2000

* Hypertension was not used as a primary renal diagnosis in this study.
Table 1. Source: Kirubakaran 1998

<table>
<thead>
<tr>
<th>Disease*</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary glomerular disease</td>
<td>26%</td>
</tr>
<tr>
<td>- presumed glomerulonephritis</td>
<td>(14%)</td>
</tr>
<tr>
<td>- immune mediated glomerulonephritis</td>
<td>(12%)</td>
</tr>
<tr>
<td>Glomerulomegaly</td>
<td>14.2%</td>
</tr>
<tr>
<td>Diabetic nephropathy</td>
<td>27%</td>
</tr>
<tr>
<td>Uncertain aetiology</td>
<td>8.7%</td>
</tr>
<tr>
<td>Obstructive Uropathy</td>
<td>5.2%</td>
</tr>
<tr>
<td>Renal Calculi</td>
<td>4.5%</td>
</tr>
<tr>
<td>Reflux nephropathy</td>
<td>3%</td>
</tr>
<tr>
<td>Amyloidosis</td>
<td>6.4%</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>5%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
</tr>
</tbody>
</table>

While the cause of ESRF has been thought to be classically due to a single disease process, research in Australia and overseas suggests that ESRF is the result of a complex interplay of genetic and environmental factors. Put simply, an individual may be at risk of developing ESRF because of a low “nephron endowment”, which is due to factors such as inheritance, gender and intra-uterine and perinatal malnutrition. Subsequent renal insults, such as infections, obesity, diabetes and hypertension accelerate loss of renal function and lead to ESRF (Hoy, 1996 and Thomas, 1998).

2.2. Incidence and Prevalence

The Northern Territory continues to have the highest incidence (number of new cases per year) and prevalence (total number of cases each year) rates of ESRF in Australia.

Figure 2 compares the incidence rates (expressed as the number of cases per million people per year) of Indigenous and non-Indigenous people in Australia, while Figure 3 demonstrates the incidence of ESRF in Indigenous people by State. The higher rates in the NT and WA are noteworthy.

Indigenous people continue to make up the largest proportion of people with renal disease in the Territory. They continue to enter dialysis programs at a younger age than non-Indigenous clients - on average 10 years earlier.

Figure 2. Source: ANZDATA and Cass 2000
The total number of people on all forms of dialysis each year is recorded and expressed as a prevalence rate. This is a measure of the accumulated scale of the problem, rather than the number of new cases per year and is again expressed as the number of cases per million people. The prevalence of people on dialysis in the NT in 1998 was 821 cases per million people. The prevalence in all other states is considerably lower, the Australian average being 295/million, which puts the prevalence in the NT at 2.8 times the national figure. (ANZDATA 1999)

The following graphs demonstrate the increasing numbers of people receiving RRT in the Territory between 1995 and 1999. Figure 5 indicates the number of haemodialysis treatments delivered in the NT within the same period.
2.3. Life Expectancy and Uptake of Services.

During data collection for this report, a review of cases of ESRF in the Top End since 1993 noted the following:

- of the Indigenous deaths, 85 per cent occurred before five years on treatment;
- 75 per cent of all people with ESRF have been on treatment less than five years;
- 62 per cent of non-Indigenous people on RRT have had transplants compared to 15 per cent of Indigenous clients; and
- only one non-Indigenous person has been on dialysis longer than three years, because of the much higher transplant rate in the non-Indigenous group.

Similar findings arose from the review of Alice Springs clients since 1990, which showed:

- of the Indigenous deaths, 90 per cent occurred before five years on treatment;
- 85 per cent of all people on RRT have been on treatment less than five years;
- 50 per cent of non-Indigenous people on RRT have had transplants compared to 22 per cent of the Indigenous clients; and
- as with Darwin, no non-Indigenous person has been on dialysis longer than three years.

These findings support previous reports of the mortality rate of Indigenous people with ESRF being five times greater than that of non-Indigenous people. While the major causes of death remain cardiovascular and infectious diseases, a significant proportion of people with ESRF (estimated at up to 25 per cent) die because they withdraw from therapy.

There may also be a significant number of people who die as a result of extended community visits that interrupt their courses of treatment. Strictly speaking this is not withdrawal. Rather it illustrates a conflict that is ever-present for people with ESRF who come from remote Indigenous communities. It may be difficult for them to reconcile leaving home for treatment that may be literally life-saving with their obligations to family, community and land.

Additionally, both Alice Springs and Darwin renal units acknowledged that a proportion of people with ESRF declined therapy because it demanded relocation to a metropolitan centre. Although the Alice Springs unit has started to collect data on the number of clients choosing not to enter the Renal Outreach program, it is nevertheless likely that the true number of people declining dialysis will remain an underestimate.

2.4. Projections

A number of researchers have made projections in the recent past for new cases of renal disease in the Indigenous population and estimates of the prevalence of people receiving RRT in the Territory. The models used to make these projections vary but most to date have been based on historical data and trends in presentation. Ideally projection models require 10 years of historical data and they need to consider a number of factors for both incidence and prevalence. For incidence rates, these are:

- the uptake of prevention, screening and intervention programs and their potential impact;
- the pre-dialysis status of identified and unidentified community members with chronic renal impairment (CRI); and
- the entry parameter used to define someone as having CRI and ESRF.
While for prevalence rates, they are:

- level of acceptance onto program - client acceptance and medical referral;
- dialysis death rates;
- size of transplant program, percentage of potential dialysis population on waiting list;
- transplant failure rates - acute, medium and long term; and
- death rates for transplant clients.

### 2.4.1 Pertinent Background

#### Top End

Haemodialysis in the Territory began in 1970 with two non-Indigenous people on home dialysis in the Top End. They had been sent to Adelaide for surgery and training before returning to Darwin. People from Alice Springs with ESRF had to relocate to Adelaide permanently if they wanted treatment.

Acute dialysis commenced in 1978 in the Intensive Care Unit at Royal Darwin Hospital and by 1982 five non-Indigenous people were on home dialysis, with one Indigenous person on self-care dialysing with their “buddy” at RDH. In 1984 Nightcliff Community Centre became a satellite unit with two stations. As numbers escalated from 1989, capacity was expanded twice until the unit was operating 12 stations by 1993.

It is relevant to note that a number of new consultants permanently relocated to the Territory in the late 1980s, increasing both support services to the communities and referrals for ESRF treatment. This growth is evident in the need to develop a dedicated area within the hospital for acute treatments in 1993. The Queen Elizabeth Hospital in Adelaide provided a nephrologist on quarterly visits until 1996, when a dedicated nephrologist was appointed to RDH. The Nightcliff unit had again reached capacity by 1997 and another extension then raised to 23 the number of stations.

It is not clear when or why home dialysis ceased but there is evidence that people were still dialysing at home up until 1989. It is believed home dialysis was suspended in 1990 due to natural attrition (through death or transplants). From that time people with ESRF were not encouraged to make the transition to home dialysis, as the greater majority had been relocated from remote communities and it was difficult to find suitable accommodation and reliable buddies. Newly-diagnosed people have since been prevented from undertaking home haemodialysis because of the perceived expense associated with capital equipment requirements.

#### Central Australia

Satellite dialysis in Alice Springs commenced in 1987 with a dedicated unit of 10 stations and the employment of a renal physician. The renal unit in Flynn Drive also underwent an expansion in late 1997, increasing its capacity to 23 stations. Home dialysis has not been available in Central Australia.

The visiting nephrologist from the QEH in Adelaide, Dr Pugsley (1993), noted the rapid increase in the numbers of people on RRT in the Territory. He believed that it was unlikely that the rise was due to an increase in incidence or that there were fewer cases of ESRF prior to that period. He suggested that the apparently lower incidence in previous years had been due in part to an absence of local treatments, a lack of relevant medical expertise and the fact that identified cases were either transferred out or were untreated till their death.

In particular, he claimed the rise in incidence and prevalence in the Central Australian area could be attributed to more people being referred for treatment due to the proximity of the service, compared with the numbers presenting when permanent relocation to Adelaide was the only option. He also noted treatment options had a higher profile and there was better screening in the communities because they were now visited by, or had contact with, the renal physician based in Alice Springs.
Dr Pugsley observed at that time that there were few people with transplants and the life expectancy of people starting dialysis was a short two to three years. He believed the Territory would continue to produce 20 new clients a year.

2.4.2. Past Projections

In 1993 Hoy et al (1995:309) predicted there would be 400 new cases of ESRF by 2010 based on research findings for previous years. Projections quoted in the Nguui Feasibility Study undertaken by Associate Professor Mahoney (1995:22) were based on estimates completed by Hoy and Mathews in 1993 as a result of their extensive studies in renal disease. The assumptions for the projections were:

- rates were based on observed incidence rates between 1985-92;
- it made allowance for aging of the population and some under-diagnosis of ESRF in the recent past; and
- cases of ESRF in people 70 yrs old and over were ignored.

**MSHR Estimations of New Indigenous Cases vs Actual (RDH and ASH Separated)**

Figure 6. Source: Mahoney 1995 and THS (author) 2000

Figure 6 illustrates the projections for new cases among Indigenous people in the NT against actual events. It demonstrates that, while actual new cases are higher than projected, they are not rising exponentially.

The number of cumulative new cases (Figure 7) is sitting above the upper projections and is rising in a parallel path with the “best estimates”, while the total number of people of all ethnicities receiving treatment (RRT) demonstrates the significant impact of death and withdrawal on total numbers.

**Cumulative Estimates of New Indigenous Cases vs Actual plus Total RRT Clients**

Figure 7. Source: Mahoney 1995 and THS (author) 2000
In a paper for the Renal Strategy Meeting, Hoy (1997:2) asserted that the incidence of ESRF in the Aboriginal population was doubling every three and a half years. That is, for each three and a half year period the cumulative number of new patients would be double that of the previous three and a half year period. Hoy also claimed the linear projections were a serious underestimation and the exponential estimate suggested that 120 new cases would present each year from 2001. She extrapolates this figure to set the number of people requiring RRT at approximately four times the incidence rate. Table 2 compares projections with actual numbers to date. It is believed the estimates made by Hoy are for the Top End only, as comparison with actual figures demonstrates some discrepancies.

Projections of New Cases of ESRF Amongst Aboriginal People for the Next Two Four Year Intervals

Table 2 Source: Hoy 1997 and Cass 2000 unpublished

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Spencer et al (1998: 537) noted that more Indigenous people presented with ESRF between 1993 and 1996 than in the previous 15 years of the program. The authors claimed this demonstrated the incidence was doubling every four years. They also noted that haemodialysis was the most common form of treatment and prevalence was doubling every 2.5 years. Survival on dialysis was estimated at 3.3 years while graft survival was estimated to be 37 per cent at five years. They concluded that survival rates had not improved in the last five years, but the major cause of death had shifted from infection to cardiac disease.

Spencer et al believed the increase in incidence was not related to the ageing of the Indigenous population as the younger age groups were well represented. Further, they surmised that increased screening could not be responsible for the rise, as they believed community awareness of renal disease had been high since the mid 1980s.

Figure 8 compares dialysis treatments delivered in Alice Springs and Royal Darwin Hospital for two 2.5 year periods.

From 1987 to 1997 the Central Australian nephrologist, Dr Meshach Kirubakaran (1998) reviewed 423 people with renal disease who did not necessarily have renal failure. Kirubakaran found that the numbers of new cases for each four-year period doubled. He noted that the average time for a person's creatinine to rise from less than 200 mmol to greater than 900 mmol was 29 months.

Ilan Warchivker (1998) undertook a study for Tangentyere Council to determine the future need for housing within Alice Springs. His report made predictions on the potential number of clients in Central Australia requiring haemodialysis within the coming years. It had been assumed that people with transplants and those on peritoneal dialysis would return to their communities and therefore not require housing.
Warchivker’s assumptions included:

- the number of new cases of chronic renal insufficiency (CRI) would increase annually by 20%;
- a proportion of people with CRI would go onto peritoneal dialysis (PD) or have transplants;
- the number of new clients will increase by four per year;
- 30 per cent of people on haemodialysis would die each year, with the percentage dropping to 25 per cent over time; and
- 15 per cent of people with CRI would die before receiving RRT.

Figure 9 compares Warchivker’s (1998) estimations of haemodialysis requirements with actual numbers of people receiving haemodialysis treatment to date.

![Estimations of Haemodialysis Clients in CA](image)

Figure 9. Source: Warchivker 1998 and THS (author) 2000 unpublished

In 1997 Deakin University completed a report commissioned by THS to make a quantitative and qualitative analysis of the current and future impact of renal disease in Central Australia. The report, entitled “Renal Disease in Central Australia: the challenges and opportunities for better health”, made a number of predictions on life expectancy, refusal of treatment, projected incidence and prevalence. It suggested:

- survival rate appeared to be improving, with more than two-thirds of people with renal disease surviving more than three years (this is not supported by current information from ASH, which shows the average life expectancy remaining at 2.5 years);
- in some communities 35 per cent of people with renal disease refused treatment;
- as many as 1500 people in Central Australia have chronic renal insufficiency;
- over the next four years the incidence could be expected to rise from 20 to 40 people per year;
- during this period the number of people receiving RRT would rise from 70 to 148 due to improving survival rate; and
- by 2006 there would be 380 people on RRT, with 110 new cases per year.

The model presented for prevalence of RRT in Central Australia was based on:

- linear increase in incidence with four-year doubling;
- one year survival rate increasing to 90 per cent by 2003;
- constant mortality rate of 12 per cent;
- no change in the underlying drivers of renal disease; and
- prevalence would not exceed the pool of potential cases (1500).
Figure 10 compares the predicted number of clients requiring RRT with current circumstances.

![Deakin Report Projections of RRT in CA](chart)

**Figure 10.** Source: Catford 1997

### 2.4.3. Projection Models

Making an accurate projection of the need for ESRF treatments is a complex and difficult task and a significant degree of uncertainty will exist in all projections. Models used to project estimates need to consider recent events, including the reasons for the dramatic increase in referrals in the late 1980s and early 1990s and the outcomes of current screening and treatment programs.

In addition the following issues need to be factored into any projection model for renal services in the Territory:

- the number of people in the community with risk factors for renal disease;
- the extent of programs in communities to prevent the development of risk factors;
- the degree of uptake of screening and treatment programs in the community in relation to the ‘true’ level of CRI;
- the acceptance by community members of renal prevention programs that involve daily medications;
- the difficulty in estimating the rate of progression of CRI;
- the non-acceptance rate of tertiary treatment, including those who commence treatment but withdraw later;
- the impact on acceptance rates of providing accessible services such as home dialysis and satellite services;
- transplant rate, graft and client survival; and
- survival rates of people on dialysis.
3. Relocation - Social, Medical and Financial Costs

3.1. Family and Community Issues

Poor quality of life and low socio-economic status are known to impact adversely on health. People with ESRF who undertake treatment away from their community suffer both a decrease in quality of life and reduced disposable income. Their health is further affected by extended community visits during treatment and correspondingly poor dialysis attendance. The consequences of this are an increase in acute admissions, an increase in level of severity of co-morbidities and accelerated mortality.

Indigenous people are over-represented among Northern Territory people with end-stage renal failure. While not all of them are from a remote community, many are: more than eighty percent of people on dialysis in the Territory have to be relocated for treatment.

The consequences of relocation and its impact on family and community are well documented. While they are not restricted to the Northern Territory or to Australia (Wilson et al, 1994. Devitt and Mc Masters, 1998), the Territory is unique in that the majority of people with ESRF do originate from remote communities. As early as 1989 Dr Pugsley (ANZDATA: 1989) reported:

‘…the radical fashion in which aboriginal patients changed their lifestyle in order to adhere to the stringent requirements of dialysis. A commitment to the urban lifestyle by people not accustomed to it, has been challenged by the stresses of the altered geographic, economic and cultural climate.’

Mahoney (1995: 17) claimed that this theme, which he termed the ‘social price’ of renal disease, emerged over and over again in discussions with both Aboriginal people and health professionals in the Northern Territory, Western Australia and Queensland. The experience of staff at both the Alice Springs and Nightcliff Renal Units supports the comments made by Mahoney, though the term ‘social price’ seems an inadequate description. In most cases the transfer to the urban centre is the first visit to the ‘city’ for people with ESRF and they arrive ill-prepared for what they are about to encounter. Very few have been able to return to their home communities permanently while continuing treatment.

Most clients originate from communities that are either inaccessible by road or take several days to reach. Additionally, communities that are accessible by road are not directly serviced by public transport. Renal clients are dependent on someone within the community picking them up and dropping them off at the main highway (usually 20 minutes or more) in order to access the service. The length of time it takes to get to the community means that many will use their fortnightly pension to purchase one-way flights in order to maximise their length of stay. They are then reliant on family and community members to find the funds to purchase the return ticket. When this does not eventuate the clients remain until they become unwell and present at the community health clinic for assessment and medical evacuation.

The difficulties experienced by renal clients in relocating for treatment include:

- inability to be placed on the priority housing list until they have relocated to the urban centre, as for some clients, the lack of suitable accommodation for their family in Darwin affects their choice regarding starting treatment;
- lack of appropriate accommodation for families, with most hostels reluctant to accept children;
- inability of spouses to receive either carer's pensions or unemployment benefits as a result of attending dialysis three times a week with the client;
- complete lack of recognition that relocated clients are isolated from their families, communities and support networks and therefore require additional financial assistance for travel;
- high cost of internal air travel within the Territory coupled with the high cost of hostel accommodation (85% of the pension) makes it almost impossible for clients and families to save enough for return flights; and
• inability to pay for essentials such as food, rent, electricity as the spending priority is on travel expenditure.

Forced dislocation impacts on the individual, the family and the community. It involves financial cost (for the individual, the community and the system), an increased burden on community resources and services and poorer quality of life and decreased life expectancy for the client. In many instances the family will not relocate, especially where the wife is the affected partner and husbands and children choose to stay in the community, but there have been a number of cases where wives, gainfully employed in their communities, have chosen to stay with the children.

Relocation also presents new and complex problems for service providers. As Willis (1995: 603) and others since have noted, health professionals try to convince people (in a foreign language) who are often frightened and lonely to accept a highly technical and demanding treatment without the benefit of their usual support systems.

Pugsley (1993:5) noted that about 30 per cent of people refused treatment because they could not come to terms with relocation. This phenomenon was then as it is now, however, poorly documented and the reason for refusal of treatment is often incorrectly identified.

In addition there are people who commence dialysis but who are unable to reconcile treatment requirements with the need to be in their own country with family and community members. Extended community visits usually mean missed treatments, which dramatically shorten lives and leads to clients being identified as ‘non-compliant’. It is currently difficult to quantify the exact number of people who die because of the lack of appropriate treatment options.

This is because the health system is unable to track people who:

• choose not to enter the program at all;
• are lost to follow-up in the communities;
• withdraw before they have completed three months of treatment and are therefore not coded by ANZDATA; and
• are inappropriately identified as ‘non-compliant’ as a result of repeated and extended visits to their community.

The issue of acceptance of treatment is but a small part of the ‘compliance’ conundrum. If services are inaccessible and people are forced to relocate for lifesaving treatment, then strategies to improve the quality of life for people with ESRF need to be investigated. For instance, people might need particular help orientating themselves in the new environment and securing appropriate services such as housing, schooling, transport, home support where necessary and an income. A coordinated approach will go a long way to reducing the fear and stress related to the new environment.

Case management has been used in many areas for a number of years but has not widely been used in renal services in the Northern Territory. It involves a client-focused approach to achieve improved individual outcomes through assessment, appropriate referral and the provision of direct assistance. It encompasses strengthening links with mainstream services within the housing, health, education, labour market and community sectors.

Burton (1995: 28) advocates case management to improve quality of care delivered to people with ESRF. She suggests that, as people with renal disease move back and forth across the care continuum and between modalities more than any other individual group, they are likely to benefit the most from an integrated and coordinated service. Case management reduces duplication of services and ensures all services required are engaged.

### 3.2. Tiwi Dialysis Centre - Preliminary assessment

In 1994, the Commonwealth Joint Planning Committee commissioned a feasibility study for haemodialysis services on the Tiwi Islands. The Nguiu Feasibility Study, by Associate Professor Mahoney, recommended the establishment of a self-care haemodialysis facility staffed by Aboriginal Health Workers (AHWs). The tripartite agreement between the Commonwealth Government, the then Territory Health Services (now DHCS) and the people of the Tiwi Islands resulted in Australia’s first satellite renal unit in a remote Indigenous community. It become operational in February 1999, treating six people, and it accepted another six people four months later. It has the capacity to handle 24 people on dialysis.
The opening of the Tiwi Dialysis Centre was the culmination of many years of lobbying by the Tiwi community to have their people return home. At the time of the Nguiu Feasibility Study, the Tiwi Islands had the highest incidence of renal disease in Australia, with 16 people, out of an estimated 1800 Tiwi Islanders, receiving dialysis treatment in Darwin.

A recent unpublished study (Gorham 2000) examined the consequences of relocation for Tiwi people with renal disease, based on the experiences of the first six people to be returned to their community. Data was collected 12 months before transfer and at six and 12 months after transfer to compare health indicators and adherence to treatment. The study also drew some conclusions on the financial cost to the service provider, the community and the individual based on interviews and assessment of expenditure. A quality of life survey, designed by the author, compared activity levels, diet, expenditure and family and community interaction.

Attendance at treatment improved to 100 per cent after treatment at home began, compared to eighteen episodes of non-attendance in the previous year that involved four Accident and Emergency presentations and three hospital admissions. There were sixteen other hospital admissions that were unrelated to compliance. In the 12 months after transfer, no compliance-related admissions were recorded, although there were ten acute admissions which were not considered preventable. Overall there was a reduction in the number of acute admissions and length of stay in the 12 months following the transfer.

Health indicators such as blood pressure control, albumin, haemoglobin, urea reduction ratio and fluid gains between treatment all demonstrated improvements that were borne out both in physical examinations and in the way people described the state of their own health.

The way people dialysing on the Island responded to the quality of life survey highlighted the isolation from the local community they felt when they were living in the urban setting. Their responses also showed they had become more involved in activities generally and in the community and their diet had improved since their return. The group also reported a reduction in cost of living, despite food and clothing being more expensive on the island. They said they had difficulty in budgeting in Darwin for essential services such as rent, electricity and transport, while the need to visit their home community, involving as it does the cost of an airfare, was an additional burden on an already stretched budget.

Service delivery expenditure was assessed on the direct costs identified from Trend Star reports for each cost code. It included expenditure that may have been incorrectly invoiced or absorbed into other cost codes, but did not include the allocation of overheads incurred by Royal Darwin Hospital. Some studies include the capital expenditure required to establish the service, amortising the costs over one to five years and including it as part of the service delivery expenditure. While this costing acknowledges that capital expenditure costs are higher in a remote setting, it did not include them - amortised or not.

Recurrent expenditure was similar for both Darwin and Nguiu despite the additional expenses of staff flights, travel allowance and air and sea freight. The ability to reduce the staffing levels to one renal trained AHW after one year reduced yearly expenditure per client below that of Nightcliff Renal Unit.

Overall expenditure was less in the remote setting, principally due to reduced requirements for client and staff training, additional support from the Social Worker and Aboriginal Liaison Officer and frequent medical reviews.

Any assessment of the true cost of providing dialysis services for people from remote areas in the urban setting must also consider its impact on the community. People who have to move away from their community and family have a greater need for support services. Costs incurred by the community include increased burden on priority housing, more disability pensions and lack of employment opportunities for spouses.

The significant number of unpaid debts due to the increased cost of living in the urban setting impacts on the social workers and Aboriginal Liaison Officers, involving the Aboriginal Legal Aid service, interpreters and court time. Moreover, schools must provide language and other support for the children of people on dialysis. Children who feel the lack of friends, familiar faces and languages may be more inclined to be truants and as a result their numeracy and literacy levels are likely to decline.
People with renal disease who have to relocate suffer both a decrease in quality of life and reduced disposable income. Their health is further adversely affected when extended community visits mean poor dialysis attendance. The consequence of this is an increase in acute admissions and greater severity of co-morbidities. The suggestion that expenditure per person in the urban setting is considerably higher because of the unquantified acute care costs may be borne out in further studies. Furthermore, indirect costs associated with relocation for treatment are high and move beyond the direct stakeholders to the wider community.

This initial assessment of a community-based dialysis unit finds generally positive outcomes. There is a demonstrated improvement in compliance and overall health with fewer acute admissions. The clients also reported improved wellbeing, higher quality of life and increased disposable income. Recurrent expenditure was assessed as being similar for both urban and community-based units with similar staffing levels. Whether this situation is sustainable or can be replicated in other remote communities is yet to be seen.
4. Health Investments

4.1. Health Status of the Northern Territory

The Northern Territory forms 15 per cent of the Australian land mass yet has only one per cent of the country's total population. About two-thirds of the population lives in Darwin, Alice Springs and three major regional centres. The balance is widely dispersed in smaller and more remote communities. Indigenous people make up 27 per cent of the NT population. Many of them exhibit the worst health status of any Australian, with unacceptably high levels of chronic disease and a life expectancy as much as 20 years less than the Australian averages.

The chronic diseases of diabetes, renal disease, heart disease, hypertension and chronic airways disease affect the whole NT population as unhealthy lifestyles are an Australia-wide problem, but Indigenous Territorians are particularly affected. These diseases have common underlying factors, which are inextricably linked with the broader socio-economic determinants of health and quality of life, particularly education and employment. (PCDS, 1999)

The health system tries to provide services to the largely scattered communities of the NT. This includes hospitals in the five main urban centres and a widely dispersed network of small community health clinics, but it is acknowledged there is a dearth of GPs in the bush. The intractable nature of chronic diseases and the increasing costs of acute care combine to threaten the availability of resources for preventative strategies that may improve the health status of the community.

The recent trend towards the systematic collection of epidemiological data to assess the overall burden of disease is also useful in making assessments and determining the benefits of resource allocation. The current challenge is to combine economic and epidemiological tools to link risks and benefits in order to inform the distribution of services (equity) and technical standards (improving efficiency of health service within budget constraints) and to improve the effectiveness of allocation (health investments). (Swerissen, 1999:2)

4.2. Co-morbidities and Renal Disease

People with End Stage Renal Failure frequently have co-morbidities. These are related to both the underlying conditions causing renal disease, such as diabetes, hypertension and chronic infection, and to the consequences of progressive renal dysfunction such as anaemia, anorexia and malnutrition and accelerated cardiovascular disease.

Late presentation for identification and treatment, together with an inadequate uptake of services, exacerbates the severity of co-morbidities and often results in an increased burden on acute services.

People with ESRF (both Indigenous and non-Indigenous) report diminished physical activity that is related both to the demands of the treatment regime (frequent and long hours on dialysis) and to disease status factors such as anaemia and drug therapy. For many people, this means they are unable to maintain employment and it reduces their capacity to live their usual daily lives.

The majority of people with ESRF and their carers experience depression and anxiety, which further affects their ability to self-manage. This depression and anxiety is compounded by the need to relocate for treatment and extends to the family and community, who mourn the disappearance of their community members.

Strategies to reduce the impact of co-morbidities may include early screening, follow-up and intervention, together with education in language, early preparation for treatment, appropriate treatment choices and accessible services.

4.3. Prevention, Screening and Intervention Programs

Recent work in the Territory has identified a number of preventable chronic diseases that are prevalent among Aboriginal people. Diabetes, renal disease, hypertension, ischaemic heart disease and chronic airways disease all have similar underlying factors of poor nutrition, inadequate environmental health conditions, alcohol misuse, decreased activity and smoking. Many of these conditions may have their origin in utero and in early childhood as a result of foetal malnutrition, low birth weight and repeated childhood infections. These factors are worsened by lifestyle changes, which reflect unrelenting socio-environmental constraints rather than personal preferences. (PCDS, 1999)
Strategies to improve health involve recognising the underlying determinants of ill-health and acknowledging a community’s own objectives. They also need a culturally appropriate intervention program, appropriate education and training and adequate resourcing of both staff and facilities to implement the program. Evaluation and assessment of outcomes must be an integral part of any program.

Guidelines for screening and intervention are readily available in the Territory and all communities should have access to at least one of the following:

- Guidelines, Standards and Audit Team (GSAT) Protocols
- Central Australian Rural Practitioners Association (CARPA) Standard Treatment Manual
- Preventable Chronic Disease Strategy (PCDS) Protocols including the Total Recall System and Coordinated Care Trial Information System.

To date, a lack of support services and staffing have not permitted an evaluation of individual communities, the programs available or degree of implementation.

Recognised barriers to successful implementation include:

- insufficient support services to train and educate clinic staff;
- inadequate reliability of computer hardware/software and the difficulties and expense of getting regular technical support for remote communities;
- delayed awareness of Guidelines among community health staff; and
- a failure to embrace proposed Guidelines by some communities due to a lack of a sense of ownership.

The Office for Aboriginal and Torres Strait Islander Health (OATSIH) convened a national renal working party in late 1999 to standardise screening and management guidelines for renal disease. The National Aboriginal and Torres Strait Islander Renal Disease Scientific Working Group (NATSIRDSWG) guidelines, which are due for release soon, are similar to the guidelines described in the GSAT, CARPA and PCDS protocols.

It has to be recognised that no single prevention, screening and intervention model will be suitable for all communities. The primary objective should be to ensure a chosen model is endorsed and adjusted by the community to meet their particular cultural requirements.

4.3.1. Preventable Chronic Disease Strategy

The Preventable Chronic Disease Strategy (PCDS, 1999) is the overarching framework in DHCS for the prevention, early detection and best practice management of the common chronic diseases. The strategy, which has been endorsed by the Department and the Minister for Health, advocates an integrated, inter-sectoral and whole of life approach that is relevant to everyone in the Territory regardless of ethnicity or location. It has been developed to help communities and health service providers to determine what programs would be of the greatest benefit to the community based on their specific health needs.

The PCDS is a set of guidelines based upon six key result areas around a three-point framework:

1) Prevention (4 key result areas)

- maternal health - improving infant birth weight
- promotion of child growth - breastfeeding, immunisations, improving environmental health
- underlying determinants of health - education, alleviate poverty, enhance sense of control
- lifestyle modification - smoking and alcohol intervention programs, nutrition, weight loss and physical activity programs.
2) **Early detection (1 key result area)**
   - Early detection and early treatment through screening, immunisation and aggressive blood pressure reduction to prevent progression of renal disease.

3) **Best Practice Management (1 key result area)**
   - Best practice management of diabetes, cardiovascular disease and rehabilitation/outreach programs for cardiac, respiratory and renal diseases.

The strategy strongly advocates a case management approach that incorporates client and family and ensures systems are in place to support self-care by the client. It links community health services with hospital services and medical care with a public health approach.

As part of the implementation of the strategy, all eligible communities are adopting systems to support the management of chronic diseases through specifically designed care plans. These include both facilities that are managed by DHCS and those managed by Grant-in-Aid communities. The guidelines for the management of the diseases are based on the GSAT protocols and the Central Australian Rural Practitioner Association (CARPA) protocols. The Coordinated Care Trial Information System incorporates the GSAT protocols and is being implemented in communities with access to computerised systems. The Total Recall Project (a paper-based recall system) is used in the Top End for those communities not covered by the computerised system.

An audit or evaluation to the level of the recent Coordinated Care Trial Evaluations is planned for the near future. Members of the PCDS Advisory Committee are currently working on the development of Performance Indicators.

### 4.3.2. Coordinated Care Trials

The aim of the Coordinated Care Trials in the NT was for community-controlled Health Boards to manage a flexible funding pool to purchase health and community services for Aboriginal communities in the trial areas. This would come about through the following steps:

1. Establishment of Aboriginal Health Boards
2. Increased resources from pooling MBS/PBS and DHCS funds
3. Improved co-ordination of health services
4. Establishment of population care plans to organise delivery of preventative clinical services to the whole population
5. Implementation of individualised care plans based on best practice guidelines for screening, treatment and management (GSAT).

Participating communities were linked to computerised systems to help with monitoring, prompting and delivery of health services.

A recent evaluation (d’Abbs, 2000) concluded that service delivery improved for all population age groups except school age children. Overall, there was more screening and more of certain preventative treatments, such as immunisation. The evaluation noted, however, that despite the increased frequency of blood pressure and blood sugar level monitoring, control still remained outside of accepted standards. The audit tool did not identify whether results of monitoring were acted upon, either by a change in medical treatment or client behaviour nor whether health outcomes had improved during the period of the trial.

The Commonwealth Government has recognised a number of problems with the evaluation process. Among these is the impact of manifestly short funding cycle on continuity and consistency. A significant period of time was taken up with setting up the infrastructure and implementing the trial before service delivery could begin. The trials are being extended into other communities in the Top End.
4.3.3. Kidney Disease Prevention Programs

The Tiwi Islands Renal Disease Program (Northern Territory) and the Umoona Kidney Project (South Australia) are examples of successful programs for the early detection and prevention of renal disease in Aboriginal people. Both programs conducted community screening to detect early stages of renal disease in Aboriginal people by principally measuring the urine albumin:creatinine ratio (ACR) as a marker for microalbuminuria (defined as a urine ACR between 3.4 and 34 g/mol).

In the Tiwi Islands program, urine samples were sent to Darwin and tested for urine ACR in the laboratory. In the Umoona Kidney Project, the point-of-care DCA 2000 analyser (Bayer Australia) was used for the first time to measure urine ACR levels on-site in the community setting. The small, portable DCA 2000 provided an accurate quantitative measurement of ACR in seven minutes, with the result immediately available to the community member and doctor. Aboriginal Health Workers at Umoona were trained in how to perform the urine ACR test on the DCA, as well as in quality management practices, as part of a series of measures to ensure both long-term sustainability and community ownership of the renal screening program.

In both programs, routine antihypertensive medication (Perindopril [Coversyl\textsuperscript{TM}], Servier Laboratories Australia) was offered, on a voluntary basis, to adult Aboriginal people identified through screening as requiring treatment. Perindopril, belonging to a class of medication called angiotensin converting enzyme (ACE) inhibitors, was shown to be particularly effective in slowing the progression of renal disease in adult Aboriginal people who display overt albuminuria (urine ACR greater than 34 g/mol) (Hoy, various). Recent studies have also shown there is a strong correlation between the use of ACE inhibitors and a reduction in natural deaths from cardiovascular causes such as heart attacks and strokes in Aboriginal people. (Hoy et al. 2000)

Table 3. Kidney Disease Prevention Programs

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<td>Coober Pedy</td>
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</tbody>
</table>

The Office for Aboriginal and Torres Strait Islander Health (OATSIH) and Rio Tinto, through the Australian Kidney Foundation, have funded Dr Hoy’s work group, Kidney Disease Research and Prevention (KDRP), to implement the program in other Aboriginal communities, particularly (but not exclusively) in the Top End.

The Umoona Kidney Project was handed over to the Umoona community in December 2000 as a self-sustaining program. The Project was supported by Commonwealth and State funding from 1998-2000, but no further government funding has been secured beyond this time. The South Australian Government’s ten-year Renal and Urology Services Implementation Plan 2000-2011 (Department of Human Services, 1999, p.34) states that the Umoona model should be enhanced and expanded to other rural and remote communities. It also acknowledges the importance of early detection strategies (for example urine ACR testing) and supports the training of Aboriginal Health Workers in detection processes.

The State-wide Iga Warta Renal Summit (convened by the South Australian Aboriginal Health Partnership and held in the northern Flinders Ranges in May 1999) also stated as one of its six key recommendations that the Umoona model should be expanded to other Aboriginal communities in South Australia. The Flinders Medical Centre Renal Unit has had further requests from Aboriginal communities for their renal (and other chronic disease) screening services and for education and training programs for Aboriginal Health Workers (particularly in the use of point-of-care technology). As a result, a new program called ‘Point-of-Care in Aboriginal Hands’ commenced through the Flinders’ Renal Unit in 2001.

Both programs were evaluated as successful in different ways, but at the same time resource-intensive. Table 3.1 provides a comparison between the two programs.
Table 3.1 Comparison of Kidney Disease Prevention Programs

<table>
<thead>
<tr>
<th>Tiwi Renal Disease Program</th>
<th>Umoona Kidney Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinators</td>
<td>Dr Wendy Hoy &amp; Angela Kelly</td>
</tr>
<tr>
<td>Institution</td>
<td>Menzies School of Health Research, Darwin</td>
</tr>
<tr>
<td>Location</td>
<td>Tiwi Islands, 60 kilometres north of Darwin</td>
</tr>
<tr>
<td>Population</td>
<td>Population 2500; 2267 screened, 258 treated</td>
</tr>
<tr>
<td>Target group</td>
<td>Adult treatment program after adult &amp; children (&gt;4 yrs) research screening</td>
</tr>
<tr>
<td>Principal workers</td>
<td>Dedicated community liaison workers &amp; AHW supported by research nurses from Menzies</td>
</tr>
<tr>
<td>Measurement of Key Renal Disease Marker (urine ACR)</td>
<td>Laboratory</td>
</tr>
<tr>
<td>Broader activities</td>
<td>Informed &amp; supported “Tiwi for Life” program development, active health promotion limited to discussions with people as they passed through treatment and therefore more personalised</td>
</tr>
<tr>
<td>End-points/Outcomes</td>
<td>50 per cent reduction in natural death and 67 per cent reduction in renal failure incidence over four years; millions of dollars saved over four years, just in costs of dialysis delayed or averted</td>
</tr>
<tr>
<td>Evaluation</td>
<td>No independent evaluation, but published in many peer-reviewed journals</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Program now run by AHW &amp; nurses under Tiwi Health Board with significant injection of resources from Commonwealth</td>
</tr>
<tr>
<td>Transferability</td>
<td>Similarly designed programs commencing in several Top End communities (KDRP)</td>
</tr>
</tbody>
</table>

4.4. Linking the Treatment of ESRF with Prevention and Education

There is a strong rationale for linking treatment and care with prevention and education. All stakeholders agree that prevention of disease is preferable to disease management, but the reality is that the demand for disease management may reduce our capacity to mobilise prevention programs.
Treatment and care is directed at people with the disease and communities where the disease exists. Prevention is directed at a range of groups of people, from those with established CRI through to those who are currently well, but who have a risk-manageable propensity to renal disease. Prevention education has the potential to offer the best results for the long term. Bartlett (1995:87) reported cost-benefit studies of patient education as consistently favourable with, on average, every dollar invested in patient education saving $3 - $4 in treatment costs. He concluded that the analysis offered support for the notion that efforts to reduce the demand for healthcare services can not only save costs, but can also improve quality outcomes.

While education and information is an important factor in improving outcomes, the environment in which it is offered and the impact this has on understanding and acceptance also need to be considered. Evidence from outreach programs suggest the most effective processes include:

- starting before people need acute care
- involving the whole family or significant family members
- ensuring understanding of the issues by using interpreters.

If people with CRI and their families have a greater understanding of the disease process, the consequences of choices and the requirement to relocate before they start the program, the transitional process is likely to be smoother and compliance with treatment parameters should improve.

Effective case management has the potential to reduce many of the problems associated with relocation and uptake of health services. Alice Springs has recently completed a Renal Case Management Trial and, although the number of people involved was too small for conclusions to be drawn, the feedback was sufficiently positive to expand the trial to include more people.

The role of a Renal Outreach Nurse is integral to effective case management. Most states in Australia are considering Renal Outreach positions in order to better support clients and nursing staff living in rural areas. NSW has recently extended their outreach program to cover a larger area in the Far West and to encompass activities such as staff training in renal care, as well as education and support for clients and family. The NT's Preventable Chronic Disease Strategy (PCDS) advocates Renal Outreach programs to improve education and create a better understanding of risk factors and management of chronic disease.

A significant percentage of people with renal disease in both Darwin and Alice Springs present in the acute phase, which means they need both treatment and education while they are in the acute setting. This is particularly difficult. The client feels extremely unwell and is subjected to a number of invasive and intimidating procedures, such as the insertion of a thick tube into their neck or groin for urgent dialysis. Treatment becomes a terrifying experience. People with ESRF often have a limited understanding of their condition and on top of the treatment, they have to absorb and accept repeated messages from staff that they must now stay in town for good or they will die. As an added burden, the financial conditions of Patient Travel mean that most clients arrive in the urban centre alone, without family support and without money.

It is questionable how much information people can absorb and understand when they are away from their family, their language and the familiar surroundings of home country. The development of renal education videos in Indigenous languages may improve understanding of the choices available. A properly trained interpreter service should also help people develop a better understanding of what is happening to them and what options they have. The development of translated renal educational material should, however, still be a priority.

A renal outreach nurse is someone people get to know and trust and this familiarity is an important element in helping them connect the consistent and repeated messages they have heard in the community - often over a period of years - with what is happening to them. The Alice Springs Renal Outreach Nurse believes the greatest benefit of the Renal Outreach Program to date is that she has been able to develop a rapport with pending renal clients, providing continuity of care between the primary and tertiary services.

This has reduced the fear, anxiety and stress suffered by Indigenous people as they attempt to make a successful transition from their country to their new place of residence. Through the program, they receive information and education early enough for them to make informed decisions. The nurse can also identify a person's immediate and future needs for support services and make the necessary referrals.
There is not enough data on the program yet, however, to demonstrate that the outcomes are meeting its objectives, in particular those involving the needs of Indigenous people and communities.

4.4.1. Barriers to Successful Implementation of Prevention, Screening and Intervention Programs

There are complex reasons why prevention and best practice measures that have been effective in one community may not be readily replicated in others. Health providers need to be aware of and address the barriers to successful implementation and should consider:

- separate funding structures for acute and chronic/preventative care results in an ad hoc approach to holistic care, in which it is difficult to separate preventative counselling and education from acute services if clinic staff are responsible for delivering both;
- acute services take precedence over prevention and screening;
- allocating the same importance and therefore resources to prevention of chronic diseases may improve community education and outcomes;
- screening without adequate follow-up is worthless;
- health professionals at every level must be educated about the importance of and potential for health prevention programs;
- it is also important to support the Aboriginal Health Workers, recognise their skills and cultural responsibilities and acknowledge the difficulty some have in implementing western bio-medical guidelines;
- decreasing numbers of AHWs in communities means a constant program of education and re-education, which is time consuming;
- high levels of staff turnover in clinics lead to poor awareness of guidelines and compromise program continuity;
- decreased resources in communities make working conditions difficult eg. access to vehicles, clinical tools or adequate remote information technology support; and
- many intervention programs do not match community needs. Individual communities need to engage in designing intervention that meets their needs.

4.4.2. Options for Prevention Programs

The treatment of renal disease is multifaceted, but can best be implemented in a graduated response that is determined by the stage of renal disease in an individual. These stages can be defined as:

**Microalbuminuria**, the earliest stage at which renal disease may be detected. People with microalbuminuria could be further subdivided into two groups: those with additional risk factors for renal disease (eg diabetes or hypertension) and those without risk factors. People with risk factors have a greater likelihood of developing progressive renal disease and require closer monitoring and more aggressive treatment.

**Macroalbuminuria**, indicating progression of renal disease and greater protein loss. People in this group have an incrementally greater risk of progression to the following stages. There are no abnormalities on blood testing.

In the earliest stages of disease, community screening and identification of those with albuminuria offers the prospect of treatment that may retard progression of renal disease to later stages. Treatment revolves primarily around tight control of blood pressure, which has repeatedly been shown to retard progression of the disease, and treating other vascular risk factors such as hyperlipidaemia and smoking, as albuminuria is an even stronger marker for cardiovascular disease.
Mild chronic renal impairment (CRI), defined as a glomerular filtration rate (GFR) of 60 - 41 ml/min. People with mild chronic renal impairment usually have a mild elevation in serum creatinine (a marker of renal disease) but no other abnormalities on blood testing. Management of this group also revolves around control of blood pressure and vascular risk factors, which can be done within the home community.

Moderate chronic renal impairment, defined as a GFR of 40 - 21 ml/min. In those with moderate chronic renal impairment there are progressive metabolic abnormalities that are evident in abnormal serum levels of electrolytes. These may cause both increased morbidity and mortality and accelerate loss of remaining kidney function if poorly treated. It is at this stage that specialist management is required.

Severe chronic renal impairment, defined as a GFR of < 20 ml/min Severe chronic renal impairment indicates a person is likely to require RRT in the near future. At this stage management is directed toward educating them about various options in RRT and preparing vascular access. It is usually hospital and specialist based.

End Stage Renal Failure (ESRF), defined as the need for dialysis or a transplant.

An integrated approach to renal disease necessarily involves a number of different agencies. The essential factors, however are:

- primary prevention - modification of the risk factors that are believed to contribute to the complex causes of disease in Aboriginal people, such as infant and foetal malnutrition, high rates of sepsis related to environmental factors, adult obesity etc
- secondary prevention - appropriate screening and intervention in those at risk, as outlined above
- tertiary treatment - the provision of renal replacement services.

4.4.3. Prevention Models

Prevention programs must be delivered within a culturally appropriate framework and with the full collaboration of the community. There are a number of models for prevention and intervention and each community must decide which model or combination of models meets their needs.

The models are:

Do Nothing. The incidence of renal disease will continue to rise to a certain level where it will stabilise because there is a finite population.

Opportunistic Screening. As described in the CARPA, GSAT, PCDS and NATSIRDSWG guidelines. This kind of screening is clearly incomplete and it is less likely to provide adequate follow-up. The primary focus for people who are screened in this way is what brought them to the clinic in the first place and they are less likely to return for results or follow-up.

External Education/Prevention Team. Similar to the Umoona Kidney Program and KDRP programs, which involve outside organisations visiting communities to provide AHWs with training, education and assistance with screening and prevention programs. Renal Outreach programs also fit this model.

Increase Resources. Give communities enough resources so they can deliver prevention education without compromising the need to deliver acute services.

Mass screening. Mass screening involves screening the entire community and is logistically problematic. It is resource intensive and often results return too late to be relevant to either the client or the service provider. As results cannot be given to the client immediately, this type of screening involves following up on results later and bringing clients back to the clinic for information and education. Unless clients feel unwell they are unlikely to be interested in the results despite the identification of early stages of renal disease.

Invitational screening. This is a variation on opportunistic screening, in which community members are encouraged to attend for screening through education, family referral and word of mouth. The model involves short one-on-one education sessions, a model which is believed to promote the best outcomes for behaviour change.
This form of screening is based on a dedicated screening team working with a chronic care team, instead of using clinic staff in an attempt to deliver both acute and chronic services. Staff need to develop good relationships with people in the community to get them to come back for further discussions about their condition and more screening. For that reason a Renal Outreach program may fit in with a chronic care team to deliver this kind of screening. In any case, the acute and chronic areas of service delivery on communities need adequate resources for these tasks.
5. **Improving Equity of Access**

5.1. **National Standards in Renal Services**

In recent years most states have reviewed their maintenance dialysis programs because of their burgeoning proportions. The plans reviewed for this report (WA, Qld, NSW and NHMRC Guidelines) have made similar recommendations regarding providing accessible, equitable services within the context of a restricted budget. These include:

- increasing transplantation rates;
- increasing organ donation, both cadaver and live donors;
- increasing home dialysis numbers by providing incentives such as regular respite and assistance for carers; and
- providing services as close to the client’s home as possible.

All plans have specifically mentioned Indigenous people and the issues surrounding the provision of accessible services. These include:

- lower life expectancy;
- lower transplant rates;
- the difficulties associated with self-care training;
- lack of appropriate accommodation for home dialysis in remote communities; and
- lower acceptance of and maintenance on PD.

Establishing remote dialysis facilities in Indigenous communities is potentially an expensive and high support activity. Capital expenditure for buildings and machinery is expensive and ongoing maintenance is more difficult than in the metropolitan regions. Nevertheless, the benefits of providing services within an environment of family and community support cannot be denied and WA, SA and NSW have all opened services in rural communities in the recent past. Proper planning for the establishment and management of remote satellite facilities is essential to avoid ad hoc and uncontrolled expansions.

Queensland has recently accepted a Renal Plan aimed at establishing services in remote communities within the framework of a screening and treatment program based on the Territory’s Preventable Chronic Disease Strategy. The Plan recognises the difficulties in training Indigenous people and buddy reliability, noting the benefits of the Tiwi Dialysis Centre structure (trained Renal Aboriginal Health Workers) and recommending the model for remote services. Communities that have small numbers of people with ESRF will have dialysis services for self-care clients in health clinics. The Plan recommends that satellite services should be established in communities that have a higher prevalence of ESRF, such as Mt Isa, the remote areas of the Townsville and Cairns Districts and the Torres Strait (Northern Zone Renal Services Plan 2000).

After reviewing their Maintenance Dialysis program, NSW also recommended the development of a strategy for the prevention and management of ESRF amongst the State’s Aboriginal population. Recognising the rising number of dependent people, there was a recommendation to review the tiered structure and the placement of dependent people in satellite centres with appropriate staffing levels. In addition, the review recommended the expansion of the Renal Outreach Nurse program to support clients and nurses in remote settings (Review of Maintenance Renal Dialysis Services in NSW 1996).

Western Australia has also recently reviewed their service and in particular the funding strategy. As a result, the funding structure has changed, focusing on a set price per treatment adjusted for location and modality which allows tracking of clients across the care continuum. This change in structure has enabled several rural and remote services to be established in the last twelve months, resulting in more than 70 people dialysing closer to home.
Western Australia has reached an agreement with an Aboriginal Medical Service to take over the implementation and management of a remote dialysis satellite facility based on the same pricing structure. WA has also recognised the benefits of trained RAHW and is currently developing a training program to assist with staffing in the Kimberly and Pilbara Regions (Purchasing Renal Dialysis in WA, Statewide Renal Dialysis Program 2000).

The table in Appendix 1, *State Comparison Of Service Locations in Australia*, outlines haemodialysis services and where they are available in each state. The Territory has until recently been the only state not to offer home dialysis services and despite having the highest percentage of Indigenous clients from remote communities, has centred the majority of its services in the urban area. The Territory recently opened two satellite facilities - one in an Indigenous community for self-care clients and the other attached to the rural hospital where the clients are mostly limited self-care. Many people in the Top End still have to relocate to Darwin for treatment, while people in Central Australia requiring access to renal services, must relocate to Alice Springs.

### 5.2. NT Renal Services

The Northern Territory Government delivers Renal Services in the Northern Territory from the two major centres of Alice Springs and Darwin. The two centres are 1500km apart and service a region of 1,348,020 square Km with a population of 194,268. The Department of Health and Community Services (DHCS) is responsible for the delivery of these services through the Royal Darwin Hospital, Alice Springs Hospital and more recently Katherine Hospital.

Private dialysis services are currently not available in the Territory, nor are they likely to be in the foreseeable future due to the very low rate of private health insurance amongst renal patients.

See tables 4 & 5 for structure and composition of services.
Top End Renal Services

Table 4 Source: THS (author) 2000 unpublished

Nightcliff Satellite Unit

Dialysis Stations: 23
Caters for:
1. Maintenance Dialysis
9. Minimal Care Dialysis
3. Client Haemodialysis Training
4. Peritoneal Dialysis Training and Client Support
5. Staff training – RN, EN, AHW
6. Support and management of Tiwi Dialysis Centre
7. Pre and Post transplantation care
8. Allied Health Support of Social Worker, Aboriginal Liaison Officer, Dietician

Royal Darwin Hospital

Renal Ward: 10 beds
Caters for:
1. Renal Investigations
9. Acute admissions
3. Access and other renal surgery
4. Pre and post transplant care

Dialysis Stations: 5
Caters for:
1. Acute dialysis
2. ICU and plasmapheresis
3. Dialysis during admissions
4. Overflow dialysis

Queen Elizabeth Hospital

Provides support for:
1. Client acceptance for transplantation
2. Transplantation operation and immediate post-op care

Katherine Hospital

Dialysis Stations: 4
Caters for:
1. Limited and minimal care clients
2. Staff and clients trained at Nightcliff
3. Staffing supplemented from Nightcliff but
4. Financial and operational management is independent
5. No acute dialysis, transferred to RDH

Tiwi Dialysis Centre

Dialysis Stations: 6
Caters for:
1. Self-care haemodialysis clients
2. Short respite for dependant clients
3. Support/monitoring for returned peritoneal and transplanted clients
Central Australian Renal Services

Table 5 Source: THS (author) 2000 unpublished

**Alice Springs Hospital**

No dedicated renal ward
Medical ward caters for:
1. Acute admissions
2. Renal Investigations and surgery

Dialysis stations: 1
Caters for:
1. Acute dialysis
2. Admissions too unwell to travel to Flynn Drive

**Flynn Drive Satellite Unit**

Dialysis Stations: 23
Caters for:
1. Maintenance Dialysis
2. Minimal Care Dialysis
3. Client Haemodialysis Training
4. Peritoneal Dialysis Training and Client Support
5. Staff training – RN, EN, AHW
6. Support and management of acute services at ASH
7. Outreach Services
8. Pre and Post transplantation services
9. Allied Health Support of Social Worker and Aboriginal Liaison Officer

**The Queen Elizabeth Hospital**

Provides support for:
1. Client acceptance for transplantation list
2. Transplantation operation and immediate post-op care
3. Access and other renal surgery

5.3. **Barriers to Delivering Efficient Effective Services**

The lack of appropriate hospital facilities and satellite centres results in a number of differences in the management of renal services between the Northern Territory and interstate facilities.

- Most people with renal disease interstate live within a one to two hour drive of a dialysis facility, while in the NT more than 80 percent of the clients are forced to relocate from remote communities and therefore lack family and community support.

- A significant percent of NT clients fit the conventional definition of “medically unstable” (the inability to maintain blood pressure and pulse during dialysis) yet they are cared for in the satellite facilities.

- Care of medically unstable clients and client training, require particular environments and different staffing ratios; this is not currently possible within Northern Territory units.

- With more than 90 percent of the dialysis population of Aboriginal or Torres Strait Islander descent and many speaking English as a second or third language, self-care training takes longer and is less likely to be achieved without adequate and accessible interpreter/translation services.

- The shortage of specialised nursing staff nationally and internationally, coupled with the high levels of staff transience in the Territory, results in a continuous flow of staff in training, which is an additional burden on the renal budget.
An additional difficulty is the shortage of experienced and qualified staff working in both the Top End and Alice Springs units. The core group of stable staff in both units have been trained on site and have not worked in other units. Maintaining skill mix and quality of care is an ongoing battle for both Darwin and Alice Springs.

The following graph (Figure 11) identifies each dialysis modality and location according to state. It highlights the high percentage of satellite dialysis in the Territory, the comparatively low number of peritoneal dialysis clients and the lack of a home haemodialysis option. (ANZDATA Interim Summary 31/3/00)

![Method and Location of Dialysis by State](image)

Figure 11. Source: ANZDATA 2000

5.4. NT Renal History

Renal Services in the Northern Territory have developed in an *ad hoc* manner since 1976 when the first home dialysis treatment was offered. The first dialysis unit in the Northern Territory opened in Darwin in 1980. It was relocated to Nightcliff in 1983 in order to accommodate extra clients. Further expansions occurred in 1986, 1990, 1991 and again in 1997 in response to increased demand. Alice Springs opened the Flynn Drive Satellite Unit in 1987 and expanded in 1997.

In 1992 the Policy Co-ordination Branch of the then NT Department of Health and Community Services prepared a paper for the senior executive of the Department. This was followed by a Renal Service Planning Committee report by Dr Dunjey in 1994. Dunjey's report noted that 'The history of Renal Services in the NT appears to be peppered with regular crises, often involving the Minister and resulting in expanded services or facilities'.

In the year 2000 the situation continues, demonstrated by the negotiation of dialysis services for Katherine in exchange for Native Title Holders relinquishing their rights to strategic blocks of land. The negotiations were carried out despite concerns of the clinicians regarding the appropriateness of the location. The inability for all clients to be independent in their treatment led to the perception of inefficiencies at the Katherine Dialysis Unit and questions as to whether its ongoing operation was sustainable.

In Central Australia the *Living on Medicine* (1996) and Deakin Reports (1997) led to the foundation of the Central Australian Renal Forum comprising of senior executives from THS, ATSIC, OATSIH and CAAC. The Central Australian Regional Renal Plan was then developed but its current status is unclear.

There have been several reports and documents assessing renal service delivery in the Territory. Many were commissioned by the then THS but few have endorsed status (ie THS accepting the findings and agreeing to implement the recommendations wholly or in part eg the Deakin Report) and it is uncertain how many recommendations from the reports have been accepted or implemented. Indeed, there is little evidence to suggest that the reports have informed policy direction or strategies and the future direction of renal services is unclear.
In Central Australia, however, a number of initiatives arising from the Devitt and Mc Masters (1998) reports (originally released in 1996) have been implemented. Inter-agency collaboration has developed a framework that focussed on improving the clinical care, client and family education and available accommodation for relocated clients. As a result there is now a hostel, a social worker position and a case management model. In addition the Renal Outreach position was reviewed and developed along the lines of the NSW position to provide a greater level of renal education in the community.

The Northern Territory Government has identified Aboriginal Health as an area where improvement is necessary and achievable and many of the government's strategies are directed towards this objective. The following key documents relate to improving Aboriginal Health and have the potential to have a significant impact on the delivery of renal services in the Territory, if implemented with appropriate resource allocation.

**Foundations for Our Future** was announced on June 1st 1999 as the then Government's new vision for the Northern Territory's future. It comprises of 6 key directions, which are designed to underpin the policies, plans and actions for the future. These are:

1. To preserve and build on the lifestyle of all Territorians
2. To build on a successful resource based economy
3. To become the supply, service and distribution centre for the Region
4. To foster partnerships in Aboriginal Development
5. To diversify the economy through service industry growth
6. To encourage strong regions and communities.

Key Direction Number 4 has particular significance for Renal Services as it encompasses:

- collaboration and the development of partnerships with Aboriginal people;
- pooling of funds from Commonwealth, Territory and ATSIC where appropriate to maximise the effectiveness of resources, create efficiencies and promote information sharing;
- development of mutual respect through shared understanding, negotiation, consultation, reciprocal benefits and obligations;
- coordination for more effective and efficient service delivery to Aboriginal people, and
- community control through greater Aboriginal responsibility, accountability and ownership.

**The Aboriginal Public Health Strategy and Implementation Guide 1997 - 2002** was designed to make the public health aspects of the NT Aboriginal Health Policy achievable. The aim of the Aboriginal Health Policy is:

‘To reduce health differences between Aboriginal and non-Aboriginal Territorians by significant and sustainable improvements to the health of the Aboriginal population.’

The principles underlying the health policy include:

- *improvement* of Aboriginal Health Status;
- *improving access* to health services from community health centres to special care services;
- *equity of services* and sharing of resources. Health services must be available at the level it is needed to improve health outcomes;
- *culturally appropriate* and effective health services;
• increased participation of Aboriginal people in decision making and operational processes of the health system;
• community control and responsibility for the provision of community based health care services;
• holistic view of health, as held by Aboriginal people, should underlie health service delivery;
• a two-way information flow underpins effective delivery of health services and Aboriginal people’s understanding of this process and their participation in decision making about it; and
• intersectoral action between government, aboriginal organisations and communities to establish needs and priorities to reduce duplication and improve coordination of services.

The objectives and strategies surrounding the identified ‘Key Result Areas’ are significant in that they support the brief for this report through:

• collecting and sharing accurate and useful health information;
• resource and support health staff to do their jobs effectively;
• local solutions to local problems;
• supporting and educating local health staff in primary health care;
• hospitals to actively support public health initiatives;
• setting or influencing public health training, research, development and evaluation priorities; and
• support for individuals, communities and relevant agencies to have input into legislation and policy decision making

The ‘Territory Health Services - Strategy 21’ document forms the basis for THS’s strategic intent, which has been defined as:

To create and enhance a Territory-wide network which delivers continuing improvement in the health status and well-being of all Territorians

The framework for Strategy 21 identified 5 ‘strategic directions’:

1. Public Health
2. Primary Level Health
3. Acute and Specialist Care
4. Community Services
5. Organisational Support

The policies and strategies of the NT Government and DHCS in particular support the kind of community collaboration and involvement being proposed here in relation to renal services, both in the chronic disease phase and in the tertiary phase. There are opportunities for intersectoral and cross-agency negotiation to take place with communities. This will ensure that not only will there be services to reduce the burden of disease, but also the approach to service delivery will foster a sense of community ownership. Negotiation and collaboration requires face to face meetings which, while essential, are time and resource consuming and therefore must be adequately resourced.
6. Funding of Services From Primary Health to Tertiary Services

6.1. Primary Health

The Commonwealth and DHCS allocate money for specific health programs but few new prevention programs are allocated recurrent funding. Prevention, intervention and screening programs are considered by DHCS to be the domain of community health. DHCS management to date has resisted tertiary service involvement in programs that move beyond acute care, such as community visits and community education. Community Health Services derive funding from both Commonwealth and State sources, but most of the funding for community and primary health programs comes from the Commonwealth. New tertiary services are proposed and approved in cabinet submissions to the NT Government.

6.1.1. Primary Health Care Access Program

Following the transfer of responsibility for Aboriginal health from the Aboriginal and Torres Strait Islander Commission (ATSIC) to the Commonwealth Department of Health in 1995, each jurisdiction signed an Aboriginal Health Framework Agreement. Signatories to the 1998 Northern Territory Aboriginal Health Framework Agreement are Commonwealth and NT Ministers for Health, the Chairperson of ATSIC and the Executive Secretary of the Aboriginal Medical Services Alliance of the NT (AMSANT).

The Framework Agreement includes:

- a commitment to increased resourcing for Aboriginal health, based on need;
- joint planning processes to inform the allocation of these increased resources; and
- endorsement of the model of Aboriginal community-controlled health services as the most effective and efficient way of improving service delivery to Aboriginal populations

Under the Framework Agreement, regional and NT-wide planning structures have been established to progress these commitments. The Northern Territory Aboriginal Health Forum is the peak policy and planning forum and meets quarterly with senior representatives from DHCS, OATSIH, Department of Health and Ageing, ATSIC and AMSANT.

The Central Australian Regional Indigenous Health Planning Committee (CARIHPC) and the Top End Regional Indigenous Health Planning Committee (TERIHPC) are the regional joint planning structures which report to the Forum. Each region has now completed plans to guide the development and expansion of comprehensive primary health care in Aboriginal communities. Both plans are based on a series of ‘zones’.

Following the establishment of the joint planning structures, the Commonwealth announced a new funding initiative the Primary Health Care Access Program (PHCAP) in the 1999/2000 Federal Budget. Under PHCAP funding for Aboriginal health services will be implemented through a staged approach, based on a per capita allocation to communities. New Commonwealth funding will be pooled with current DHCS primary health care funds and will be then allocated to communities to establish community-controlled health services. This initiative has been piloted in four zones in Central Australia. (Figure 12). The Forum has established a Primary Health Care Access Working Party, which is responsible for advising the Forum on the funding, planning and implementation framework for this initiative.
Zones (Central Australia) on which PHCAP distribution is based.

Figure 12. Source: DHCS PHCA Working Party 2000
6.1.2. Medicare Items

As of the 1st of November 1999, Medical Benefits Schedule (MBS) payments were expanded to include additional items claimable by General Practitioners (GPs) which involved patient care coordination but not necessarily patient consults. The inclusion of the new items will allow GPs a greater focus on preventing disease, minimising impact of existing conditions on older people and on coordinating the care of patients with complex needs more effectively. The Enhanced Primary Care Package covers health assessments for people aged 75 and over (or over 55 for ATSI people), the development of multi-disciplinary care plans for patients with complex or chronic diseases and management of case conferences.

Under the package:

• aged health assessments can be conducted in the home or in the clinic and attract a benefit once per year
• in the community setting, GPs can claim for preparing a care plan or contributing to and reviewing an existing plan
• in the hospital setting, this also covers preparing and contributing to discharge plans for private patients
• case conferencing covers both the hospital and community setting and includes organising, coordinating and participating in a case conference.

People with renal disease would qualify for care plans and would be entitled to two full assessments and two reviews per year.

The inclusion of the items allows GPs to be more involved in the total and multi-disciplinary care of their patients. Figures recently released showed a 50 per cent increase across Australia in claims for the new MBS items (Enhanced Primary Care Update, 2000). Interestingly the NT had a total of 174 claims (only 10 for health assessments) compared to the highest figure of 10,263 made by GPs in NSW. The Divisions of General Practice in the NT are promoting the use of these items through an education program. With some creative management strategies, it maybe possible for larger practices to effectively use the increased income to employ extra nursing and allied health staff.

In most remote Aboriginal controlled health clinics GPs are employed on a salaried basis and Medicare billing is directed to the organisation. Medical staff employed by DHCS in rural and remote communities are salaried and may not access Medicare billing.

6.2. Casemix

Casemix funding was introduced by the Commonwealth Government as a way of funding hospitals according to the type and level of services delivered. It categorises different diseases and treatments largely according to an International Classification of Diseases (ICD-10-AM) and the Australian National Diagnosis Related Groups (AN-DRG). Weights are allocated for services that would generally be required during the course of an admission for each Diagnosis Related Group and this equates to a dollar figure. Weighted Equivalent Inlier Separations (WEIS) refers to the funding allocation per AN-DRG plus an additional amount to include the general operational costs less easily identifiable, such as administration and facility overheads.

The Commonwealth allocates health funds to the Territory, but this is not tied funding and does not specify an allocation for particular services, such as renal services. The NT Treasury in turn allocates the funding to DHCS and this is then distributed to Royal Darwin Hospital (RDH) and Alice Springs Hospital (ASP) for renal services, based on historical usage.

Everyone undertaking haemodialysis in a satellite centre or hospital in the Northern Territory are admitted under the DRG 572 (AN-DRGv3.1) or L61Z (AN-DRGv4.1) ‘Admit for Renal Dialysis’. At the time of writing this report the funding value in the NT for DRG 572 was $476 per treatment. However, funding - based on the number of treatments completed (or projected) multiplied by the DRG value - is not allocated to the service delivery area. Budget allocations to date have been based on the previous year's usage.
Hindle and Hodkinson (1995) undertook a review of maintenance dialysis in NSW and noted that the DRG categories provided a less than optimal understanding of dialysis services and represented a relatively simplistic approach to the description of a complicated clinical environment. The AN-DRG classification does not adequately identify resources required for training clients or care of peritoneal dialysis and transplant clients in the outpatient setting.

Western Australia came to the same conclusion as Hindle and Hodkinson and consequently separated renal services from the rest of the hospital funding in order to effectively track treatments across modalities and locations. (Kneipp, 2000)

The move to a Funder/Purchaser/Provider framework may allow more detailed agreements to be negotiated between RDH/ASH and specialised areas such as Renal and Rehabilitation. These agreements may take the form of funding based on outputs and/or performance indicators and may allow a more complete service to be delivered where savings made in the tertiary area can be redirected to the primary area. The difficulty will be in quantifying the amount of savings made from a particular service.
7. Cost of Renal Failure Management

7.1. End Stage Renal Failure Expenditure

Interstate and overseas costings generally agree that if transplantation is not possible, the next most cost-effective option is home dialysis followed by peritoneal dialysis and satellite haemodialysis.

7.1.1. Transplantation

Some states in Australia and many first world countries have carried out detailed costings for most renal replacement therapies (RRT). Little has been done, however, to estimate the expenditure associated with renal transplantation. There are difficulties in tracking costs across departments in the acute setting, particularly in relation to theatre time, radiology, higher staff ratios and expensive medications. Hospital Information Systems are now more sophisticated, however, and many hospitals are moving to technology that connects all departments in a service, allowing individual costs per patient to be tracked.

The limited literature that is available confirms that transplantation is the most cost-effective option of all renal replacement therapies. Studies undertaken in Spain (Aranzabal et al., 1991) and Sweden (Karlberg, 1992) noted that a successful transplant results in increased work capacity, productivity and improved quality of life, all of which further reduce expenditure in the health sector.

Aranzabal et al. estimated the 5 year accumulated costs for transplantation were 45 percent of the estimated costs for a haemodialysis client but only 25 percent for each subsequent year. The report from Karlberg was even more favourable claiming that first year transplantation costs were less than 50 percent while subsequent yearly estimates were 15 percent of hospital haemodialysis and 25 percent of home haemodialysis expenditure.

7.1.2. Dialysis - Australian Situation

Western Australia has carried out the most detailed dialysis costings available to date in Australia through Bird Cameron Accounting (1999). As a result, WA Health developed the State Wide Renal Program, which funds all dialysis services based on the type and number of treatments attended with allowances for location and training components.

After a review of maintenance dialysis services in NSW, several submissions were made to Cabinet to increase the incentives to encourage clients into home haemodialysis. These included purchasing more technologically advanced machines, providing respite care for people on home dialysis on a regular basis, training people for self-care away from dependant clients and making a submission to the Commonwealth Government to increase pharmaceutical and carers benefits for home dialysis clients.

Queensland conducted costings for maintenance dialysis (in-centre) in 1996 (DACRP, 1996) and more recently and more comprehensively (O'Brien, 1998). The reports reflected similar direct costings to those done in the NT and in WA.

7.1.3. International Situation

Countries such as Canada and New Zealand and overseas State health authorities, such as Arizona in the USA, have similar incidence rates of ESRF among their Indigenous populations. The issue of Indigenous people having to relocate for treatment is also cause for concern and there is continuing debate on how to provide economical and accessible services. Assessing how other countries manage service delivery for people from remote areas is beyond the scope of this report and comparisons may be problematic due to differences in the public health systems and funding arrangements.

A literature review established that a number of costing studies have been undertaken nationally and internationally in recent years with remarkably similar findings. The following points are pertinent to any consideration of the costs of renal replacement therapies (Table 10):

- All studies found hospital haemodialysis the most expensive, home haemodialysis considerably less expensive and transplant the cheapest form of RRT.
• Several studies noted that expenditure increased with an increase in the number and severity of co-morbidities such as heart disease, diabetes, anaemia and a decrease in serum albumin. In addition, they reported that costs began before clients commenced RRT and were significantly affected by delays in commencing treatment (Goeree, 1995. Mallick, 1997).

• There was general recognition that dialysis prescriptions need to be individualised in order to be cost effective and this may involve expensive treatments in return for long term benefits such as increased quality of life, decreased admissions and length of stays.

• Most countries were now considering incentives to encourage people towards home therapies, recognising that people on home dialysis had a better survival and quality of life than people receiving in-centre or at a satellite unit.

• Purchaser/provider frameworks should be used with caution as contracted health services may find ways of excluding people whose treatment is more complicated (Niall, 1998).

• In contrast, where the right to dialysis is legislated, the result is a dramatic growth in for-profit-dialysis units and disincentives to discontinue dialysis even when it is clearly inappropriate (Niall, 1998:25).

• In some countries inappropriate funding for each modality has resulted in cost cutting in haemodialysis to maximise benefits, resulting in decreased quality of care (De Vecchi, 1999).

• Studies recognised that estimating the expenditure for each modality was difficult due to the propensity for clients to change modalities more than once and the increased expenditure associated with each modality’s start-up costs.

• Determining expenditure for each modality is confused by inclusion/exclusion of service costs incurred at three different levels - Commonwealth, State or service institution. To illustrate this last point:

  • Erythropoietin (EPO) and other S100 drugs are expensive but reimbursed through the Commonwealth. Similarly Medicare bulkbilling can be claimed for most pathology if clients are not classified as hospital in-patients.

  • Overheads related to the support of the outpatient client and satellite facility such as Nursing Administration, accounts and transport are more difficult to determine as is surgery for access creation and other renal related conditions.

  • Direct service delivery costs, determined through cost centre expenditure may or may not include depreciation, facility lease, electricity and general maintenance.
## Table 6
Source: DHCS (author) unpublished

<table>
<thead>
<tr>
<th>State/Nation</th>
<th>In-centre</th>
<th>Satellite</th>
<th>Remote Satellite</th>
<th>Home</th>
<th>Remote Home</th>
<th>PD</th>
<th>Remote PD</th>
<th>Client Train/PPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT 1998</td>
<td>I/n/a</td>
<td>$45,768 @ ii</td>
<td>$42,486 @ i</td>
<td>sna</td>
<td>$28,057 @ ii</td>
<td>$26,327 @ i</td>
<td>Neither costing identifies location</td>
<td>I/n/a</td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td>$38,698 @ i</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WA 1999</td>
<td>$58,968</td>
<td>$33,696 @ ha</td>
<td>$59,124 @ ®</td>
<td>$19,656 @ ha $6,000 @</td>
<td>$32,760 @ ha $16,000 @</td>
<td>$26,700 @</td>
<td>Rural $27,412 @ Remote $29,192 @</td>
<td>$408 HD $343 PD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NSW * 1998</td>
<td>$40,616 ha</td>
<td>$35,892 ha</td>
<td>$34,532 ha</td>
<td>$25,506 @ plus ha and @</td>
<td>I/n/a</td>
<td>$26,343 @ i</td>
<td>I/n/a</td>
<td>$187 HD $122 PD</td>
</tr>
<tr>
<td>Qld 1996</td>
<td>$41,566 @ ha</td>
<td>$36,946 @ ha</td>
<td>$37,015 @ ha</td>
<td>$26,942 @</td>
<td>$26,440 @</td>
<td>$96 HD</td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ger/Fr/Sp</td>
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<td>3</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sw/Bel</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td>1</td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NB:** The attempt to reconcile currencies from different years and countries was beyond the scope of this report and expenditure has been allocated according to a scale of 1-5 with the most expensive form of RRT at 1 and the least expensive at 5. All International studies reported Transplantation as a 5. National estimates are direct costs with a component allocated for the same or similar overheads. Allocation for acute admissions, surgery and access creations have not been included in the costings. Expenditure associated with PBS, MBS and S100 has been excluded.

**Legend**
- **Sna** - Service not available
- @ - Recurrent costs
- ® - Capital required
- * - NSW recommends these figures be used with caution and in conjunction with other cost data and health outcome indicators to ensure its validity over time
- i - costing based on total budget expenditure
- ii - direct costing assessed by MSHR/DHCS
- I/n/a - Information not available
- Ha - Hospital assets
- PD - Peritoneal dialysis
- HD - Haemodialysis
8. Modalities and Uptake

End stage renal disease is the final result of a progressive loss of kidney function. This condition is irreversible and permanent. Renal Replacement Therapy (RRT) is necessary to sustain life and can be achieved through:

- **transplants** (the most cost effective and efficient form of replacement)
- **haemodialysis** (hospital, satellite, home)
- **peritoneal dialysis** (continuous ambulatory, automated peritoneal dialysis).

8.1. Transplantation

Transplantation is recognised as the most cost effective and appropriate of all the renal replacement therapies for its contribution to quality of life and improved client outcomes. It also offers Indigenous people from remote communities the best opportunity to return home.

In Australia there is a growing pool of people waiting for a kidney transplant and a decreasing donor rate, which means that waiting times for all people on the transplant waiting list are getting longer. Acceptance on to a transplant waiting list is generally determined by age (the very elderly and the very young being excluded) and the presence or absence of medical contraindications to transplantation.

The rate of acceptance on to transplant waiting lists for Indigenous people in the age group 15 - 55 (the age group most likely to be transplanted) is approximately half that of the non-Indigenous group. Despite the fact that more than 45 percent of people in Australia with ESRF have a transplant, fewer people in the Territory (24 percent of those with ESRF) have one.

The reasons for this are difficult to identify but may relate to:

- Fewer Indigenous clients on the transplantation waiting list. This has not been explained by differences in the number or severity of co-morbidities in the Indigenous clients but rather was reported to be due to clients either not being assessed for transplantation or withheld for other non-medical reasons (Snelling, 1997).
- Generally longer waits for Indigenous people on the transplant list due to both blood group criteria (most Indigenous people are blood group O) and Human Leukocyte Antigen (HLA) matching criteria. Indigenous HLA types are different from the predominantly non-Indigenous donor pool, resulting in longer waiting times.
- Fewer Indigenous people able to receive live donor transplants because family members may either have or be at risk of developing renal disease.
- Life-expectancy among Indigenous people with transplants is lower than that of their non-Indigenous counterparts.
- The rate of graft survival in the Indigenous population is less than the national average.

In addition to the transplant waiting list, people may also access donor kidneys through the generosity of family and friends. These are known as Living Related (LRT) and Living Un-Related (LUnRT) transplants. While they may offer the chance to increase the available donor pool there are concerns about accepting grafts from family members who may themselves be at risk of developing renal disease. Certainly this is the situation with the Indigenous population, where many family members are also likely to display characteristics of the early stages of renal impairment. A study conducted in 1993 by Van Buynnder et al noted the familial nature of the disease in one remote community, which was supported by another study (Searle, Snelling 1997). All available family members of people on dialysis were assessed as potential donors. More than 80 percent were ineligible on medical grounds and a substantial number were discovered to have renal disease.

Figures 13.1, 13.2, 13.3 illustrate the lower level of transplantation, graft and client survival in the Indigenous population.
8.2. Haemodialysis

Haemodialysis involves accessing the main blood circulatory system in order to pump the blood from the arterial circulation, through a filter that removes solutes and fluid and back into the venous circulation. Access is usually in the form of a fistula (surgical joining of an artery to a vein to increase the blood flow through a superficial vein) or via a catheter inserted in the major veins in or around the neck. While the blood is outside the body it is protected from contamination via a closed circuit, warmed and treated with anticoagulant to prevent it from clotting. Each treatment can take between four to six hours and occurs three times a week.

Haemodialysis is the most commonly accepted form of treatment with between 30 - 40 percent of the Australian population currently receiving it as a form of RRT. It is a complicated and technical treatment that requires training to carry out the process and supervise treatment although a medical or clinical background is not necessary. The majority of haemodialysis treatments are carried out in a hospital or satellite facility.
The tiered structure of renal facilities was originally created to enable efficient use of resources according to the ability and independence of the clients. It involves:

**In-centre haemodialysis**, reserved for the acutely unwell, medically unstable and those who could not attend self-care due to age or physical limitations. It was known as dependent care and staffed one nurse to one client for acute dialysis (1:1) and one nurse to three (1:3) clients for maintenance dialysis.

**Satellite facilities**, available for self-care clients who were unable to meet the criteria for home dialysis of committed buddy and suitable home environment. These clients were designated as requiring minimal-care and the staffing ratio dropped to 1:5.

**Home dialysis**, encouraged for all who can attain independent care, have a committed buddy and the home environment meets the identified criteria. They are designated as self-care and require minimal intervention. Home dialysis and satellite centre training is carried out in a separate facility away from dependent clients. It has a staff ratio of 1:1 in most states. See Table 12.

In recent years, however, there has been increasing pressure on hospitals to expand facilities to cater for the growing number of elderly patients unable to meet the criteria for home haemodialysis or self-care dialysis. This has seen an expansion in the tiered structure to include ‘limited self-care’. Many major centres are seeing a decrease in clients opting for self-care and home dialysis as the availability of supervised care acts as a disincentive. As a result, satellite units all over Australia have experienced a shift in service delivery, to a mixture of independent and dependent clients, resulting in the requirements for additional staff. Staffing ratios have shifted to 1:4 for most major facilities while some of the smaller more remote units have a higher ratio of 1:3. Further, all staff contacted commented on the pressure from the parent hospitals to take more dependent and medically unstable clients. Table 11 reflects the staffing ratios by state and facility.

The NSW Health Department in ‘Review of Maintenance Renal Dialysis Services in NSW 1996’ also noted:

‘...anecdotal evidence also suggests that Aboriginal people with ESRF are more likely to require some form of supervised care dialysis as opposed to home care dialysis’.

Most states have found that the criteria for home haemodialysis are quite difficult to meet for the majority of Indigenous people living in remote communities and only WA has been able to return more than two or three clients to their homes.

In the Northern Territory the limited number of stations within the hospital requires most treatments to be carried out in the satellite facilities. In-centre haemodialysis is reserved for acute admissions and, in the case of the Top End, overflow clients.

The satellite centres in Darwin and Alice Springs have a mixture of people with ESRF who are largely dependent, some requiring minimal care in addition to those who are medically unstable. Noble (1996) described medically stable as ‘those clients in whom blood pressure and pulse rate can be maintained within an optimal range during a routine haemodialysis procedure, given the variables involved in fluid and solute removal’. Most Indigenous clients have difficulty managing a restricted fluid intake and tend to have large volume increases between dialysis. Where their condition is accompanied by poor cardiac function, their ability to maintain their pulse and blood pressure is severely compromised. Therefore, a significant percentage of the Northern Territory ESRF population may be considered medically unstable.

A lack of separate facilities also requires people to be trained in self-care within the same facility. As a result, staffing in the satellite centres overall is similar to staffing levels quoted for in-centre dialysis carried out in interstate units.
<table>
<thead>
<tr>
<th>STATE</th>
<th>In – Centre</th>
<th>Satellite</th>
<th>Remote</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSW (PHH, NSH, RPAH)</td>
<td>1:3</td>
<td>1:4</td>
<td>1:3</td>
</tr>
<tr>
<td>WA (RPH, SCGH, Fremantle)</td>
<td>1:3</td>
<td>1:4, 1:2.5</td>
<td>1:2</td>
</tr>
<tr>
<td>SA(TQEH, FMC, Hartley)</td>
<td>1:3</td>
<td>1:4</td>
<td>1:3</td>
</tr>
<tr>
<td>Vic (Austin, RMH, PAH)</td>
<td>1:3</td>
<td>1:4</td>
<td></td>
</tr>
<tr>
<td>QLD (Caims, Townsville, PA)</td>
<td>1:3</td>
<td>1:4</td>
<td>2:5</td>
</tr>
<tr>
<td>NT (RDH, ASP, KDU, TDC)</td>
<td>2:5</td>
<td>1:4</td>
<td>1:5, 1:2</td>
</tr>
</tbody>
</table>

### 8.3. Peritoneal Dialysis

Peritoneal dialysis (PD) is a form of dialysis that uses the peritoneal membrane as a filter to exchange solutes and fluid between the body and the fluid in the peritoneal cavity. It initially requires a small surgical procedure to tunnel a tube under the skin on the abdominal wall and into the peritoneal cavity. People who choose PD must have the dexterity and eyesight to carry out exchanges, though the guidelines are flexible as mechanical aids are available and some will have the help of family members. PD is considered a gentle form of dialysis and recommended as a treatment option for the very young and elderly. It allows greater independence and freedom as it can be carried out in the home, office or school and at times that are convenient for the individual rather than fitting in with the schedule of a busy facility. With the advent of automated peritoneal dialysis machines, clients have even greater freedom as treatment can now be completed at night while they sleep.

While peritoneal dialysis would provide the independence and stability warranted for people living in remote areas, the practical experience both here and interstate is that it is not always suited to Indigenous people, nor is it a modality that is requested despite the potential benefits it offers. However, examination of our particular peritoneal dialysis population has demonstrated outcomes equivalent or better than most other units in Australia (Zentner et al 2000). Less than 15 percent of all dialysis dependant people in Australia are currently receiving peritoneal dialysis as a form of renal replacement therapy.

There are a number of reasons for this including:

- the responsibility of attending daily treatments;
- the difficulty in attending several treatments during the day in the case of Continuous Ambulatory Peritoneal Dialysis (CAPD);
- the incidence of peritonitis and exit-site infections;
- efficacy of haemodialysis over peritoneal dialysis;
- limitations of the peritoneal membrane to continue functioning as a filter;
- issues relating to body image; and
- late presentation results in initial treatment of haemodialysis.

Figure 14 compares treatment modalities - transplant (Tx) peritoneal dialysis (PD) and haemodialysis (HD) for 1999 in Australia. (ANZDATA Interim Report 2000). It demonstrates the lower number of transplant clients in the Territory, the correspondingly higher number receiving haemodialysis and the generally lower acceptance of peritoneal dialysis as a treatment option in Australia. The numbers have not been corrected for Aboriginality.
8.4. Haemodialysis Training

Haemodialysis is a highly technical treatment and it involves a high degree of motivation for many clients to tackle the complexities of the treatment. A specific self-care haemodialysis training program designed for Aboriginal people has not previously been available in Australia, although Western Australia modified their program to accommodate Aboriginal people. This included extending training time, training two buddies instead of one and using a pictorial step by step guide to setting up the machine. In addition, only people wanting to start home haemodialysis or move to the independent satellite centres are offered training. Few interstate facilities have managed to successfully train and maintain Aboriginal clients for home dialysis other than Western Australia. They currently have eight Aboriginal people dialysing in rural and remote communities.

As home haemodialysis has not been available for some time in the Territory, the requirement for a buddy has not been made a condition of self-care training. It is recognised that few houses in the Territory’s remote communities would meet the stringent physical requirements for home dialysis, while many are overcrowded. In addition, potential carers identified by the client are often unsuitable because of age or ability to accept responsibility. In many cases the carer is also sick and taking on the responsibility of their relative’s health is an unwanted additional burden.

It has been noted in the Territory that the motivation to undertake self-care training increased with the presence of a tangible goal (transfer to dialysis units on Bathurst Island and Katherine), which consequently increased compliance (Flack 2000). It was also observed that attaining a level of independence had a very positive impact on the demeanour and confidence of the client and this increased as their self-care ability increased.

Training programs vary as the following table indicates:

Table 8. Source: DHCS (author) 2000 unpublished

<table>
<thead>
<tr>
<th>State</th>
<th>Staff to Client Ratio</th>
<th>Days per Week</th>
<th>No. of Weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Australia</td>
<td>1:1</td>
<td>3 days</td>
<td>12 weeks</td>
</tr>
<tr>
<td>WA</td>
<td>1:1</td>
<td>4 days</td>
<td>13 weeks</td>
</tr>
<tr>
<td>Queensland</td>
<td>1:2</td>
<td>3 days</td>
<td>14 weeks</td>
</tr>
<tr>
<td>Victoria</td>
<td>1:2</td>
<td>3 days</td>
<td>12 weeks</td>
</tr>
<tr>
<td>NSW</td>
<td>1:3</td>
<td>4 days</td>
<td>6 weeks to 6 months</td>
</tr>
<tr>
<td>NT</td>
<td>1:2</td>
<td>3 or 5 days</td>
<td>6 weeks to 6 months</td>
</tr>
</tbody>
</table>

Interestingly Sydney Dialysis Centre, which only trains clients for home dialysis, reports that they have not set a prescribed period for training; they take as long as is needed by each client. They have trained few Indigenous clients in the last five years, however.
Training occurs for more clients on a daily basis in the Territory, albeit the level of independence achieved may not be equivalent to that of interstate facilities. The vast majority of clients in self-care training in the Territory are Indigenous while the opposite is true for interstate facilities. Although several clients have achieved complete independence and would be suitable for home dialysis, the majority must be considered ‘minimal care’ as they require some supervision or assistance with their treatment such as needling or checking calculations. There are many factors that impact on Indigenous people’s ability to achieve independent haemodialysis. These include:

- the degree of urbanisation, in particular a familiar frame of reference for technology;
- the level of literacy and numeracy;
- the format or administration of the training program;
- availability of vernacular support materials;
- experience and attitude of trainer;
- the availability of a support network including a reliable buddy to assist with treatments;
- perceived burden of responsibility associated with independence with a high technological treatment;
- understanding of the disease process and consequences of their behaviour;
- ability to alter treatment regimes according to their physiological parameters;
- physical ability to attend the treatment in terms of eyesight and dexterity;
- presence of co-morbidities that would deem them medically unstable; and
- no tangible goal associated with attainment of independence (ie home or community dialysis).

Nevertheless, the completion rates for the Territory compare more than favourably with interstate units, when it is considered that more than 30 clients have achieved at least minimal care status in the last two years. It must be noted that due to death and transplantation not all of these clients are currently receiving dialysis treatment.
9. Options for Tennant Creek

Given all the above, there is a good case for Tennant Creek to have its own renal unit. This section recaps the history of planning for improved delivery of the treatment for renal disease and canvasses the specific issues of location, support services, community support, the needs of people on treatment and their buddies; staffing, safety and supervision.

9.1. History

The increase in the number of people from Tennant Creek requiring relocation to Alice Springs for dialysis since the early ‘90s has alarmed community members. Two major studies on Central Australia (Devitt and Mc Masters 1998, Catford 1997) have highlighted the need to decentralise dialysis services. The Deakin Report saw Tennant Creek as the obvious choice for the first satellite facility, a view supported by AMSANT. There have also been repeated resolutions calling for decentralised services at the Health Summits of 1998 (Ilperle), 1999 (Banatjarl), 2000 (Gulkula) as well as the recent Men’s Health meeting convened in Tennant Creek.

In 1998, a Renal Working Group was established under the auspices of Central Australian Regional Indigenous Health Planning Committee (CARIHPC) to pursue the recommendations of Living on Medicine (Devitt and Mc Masters, 1996). At the same time Barbara Schmidt from THS reworked the Deakin Report recommendations into the Central Australian Renal Action Plan, which eventually became the Central Australia Regional Renal Plan. The status of all documentation arising from the Renal Working Group including the Regional Renal Plan, however, and that of the Project Officer Debra Graton, is unclear as it was never formally endorsed by THS (now DHCS). As a result CARIHPC sought undertakings from DHCS on their commitment to establish dialysis services in Tennant Creek; concurrently Anyinginyi Congress lobbied on its own behalf for renal services. The then NT Minister for Health, Mr Stephen Dunham, advised Anyinginyi Congress that:

‘The development of viable dialysis services at locations which will increase access for people requiring this treatment is a high priority for the Northern Territory Government.

A preliminary study of the situation in Central Australia focussing on the Barkly has already been carried out. On the basis of this information Territory Health Services staff in the Barkly District are currently developing a proposal for a renal dialysis unit being located at Tennant Creek. This will include consultation with stakeholder groups, and the input of Anyinginyi will be central to this.

At this stage it is envisaged that a submission will be finalised for consideration in the next round of hospital development funding before the end of the year. Unfortunately, until the outcome is known about the submission it is not possible to provide a more definite answer to your request.’ (19/8/99)

At the Tennant Creek Renal Committee’s September 1999 meeting, however, the Barkly Health Services manager reported that there was no further departmental commitment to the establishment of a Renal Dialysis Unit at Tennant Creek until operations at other community-based facilities in the Territory were reviewed. In October 1999, TCRC expressed concerns that what may be happening elsewhere in the Territory was affecting progress on a Tennant Creek Unit. In January 2000 the Committee accepted an offer by CRCATH to undertake additional research to provide necessary documentation.

9.2. Current Situation

Tennant Creek is a community of over 2500 people, more than half of whom are Indigenous people, situated in the Barkly Region some 500 miles from Alice Springs. Accurate demographic figures are difficult to obtain since the population of the town has changed considerably in the recent past with a down turn in the gold-mining industry, which used to underpin the town’s economy. There is strong community support and activity by Aboriginal organisations not only in medical services but also in training, business and construction development and social/support services. The services do not limit themselves to Indigenous people and access is available to all community members. Julalikari Council and Anyinginyi Congress are experienced service providers well placed to consider further extension of services into the renal field.

4 see Carney 2000 for detailed history
A sound working relationship with Alice Springs Renal Medical and Nursing staff has been established for some time. The nephrologist Dr Kirubakaran visits every 6 weeks while the Outreach Team of Outreach Nurse, PD Nurse and Transplant nurse also visit regularly to provide support and education to people awaiting treatment and those already undergoing RRT.

The 20 bed Tennant Creek Hospital managed by DHCS also has a good working relationship with Anyinginyi Congress as both often service the same clients. Medical staff from the two organisations meet regularly for combined education sessions.

At the time of this report there are 12 people from Tennant Creek and another 6 from communities in the Barkly Region on haemodialysis in Alice Springs. That is 25 percent of all people on haemodialysis in Alice Springs. Medical staff from Anyinginyi Congress expect five people from Tennant Creek to enter the program each year. Between 1993 and 1999 there were 30 new cases of ESRF from Tennant Creek.

Other forms of RRT that would enable people to return have not been as successful to date, though there are currently four people with transplants in Tennant Creek, all of whom are women and one of whom has had her kidney for 13 years. Over the past three years, four people from the Barkly have been on PD. One has had a transplant and two have died. There were plans to place another person on PD in Tennant Creek by October 2000.

Figure 15 shows the ATSIC areas with the 10 highest incidences of renal disease in Australia. This puts into perspective the exceptionally high incidence of the disease in the Barkly Region.

Carney (2000) reported that there were 15 people with CRI in the Barkly, while a further 63 are suspected of having early renal disease. Not all of the 63 clients will progress to ESRF. Some will choose conservative management or die before undertaking RRT due to age, co-morbidities or other medical conditions while the renal function of a few will return to normal. Nevertheless, this is a significant number of people with renal disease and is supported by the finding that 57 percent of the adults tested at Anyinginyi Congress had a degree of proteinuria, an early marker of renal disease.

Screening and treatment protocols for renal disease have been available for some time in the Central Australian area, with most clinics and communities being familiar with either the CARPA Manual or GSAT Guidelines. The manuals do not differ widely from what is proposed by NATSIRDSWG, Umoona or KDRP programs. Anyinginyi Congress Clinic generally uses the CARPA Guidelines for screening and intervention and moves are currently under way to update the manual. The clinic also uses the Communicare computerised system for client monitoring and recall. The degree to which prevention education, screening or intervention protocols are available and applied in the Barkly is not fully known. It is therefore a conclusion of this report that these need to be the subject of further research.
Figure 15: Incidence of ESRF by ATSIC Region (1993-98)
Source: Cass 2000 Unpublished

The map identifies the 10 highest incidence rates of ESRF in Australia according to ATSIC Regions. Tennant Creek is identified as having the highest rate in Australia followed by Aputula, also in the NT. In fact three out of the highest five incidence rates are located in the NT.
9.3. Indigenous Support Services in Tennant Creek

Anyinginyi Congress Aboriginal Corporation (ACAC) in Tennant Creek is an Aboriginal community-controlled health service providing comprehensive primary health care for Aboriginal people of the town and out-stations. Its services and programs are primarily for Aboriginal people but many non-Aboriginal people utilise them. ACAC also services a number of small communities within a 100km radius of town.

Anyinginyi's services include:

- Health Clinic;
- staff from the clinic also visit the Primary school, Pulka Pulka Kari Nursing Home and Disability House and do home visits on a need basis for consultations, dressings, medications and post-natal visits;
- the daily Bush Mobile service visits over 300 people on out-stations and bush camps;
- Dental Services;
- Alcohol After Care Services (counselling, support services and programs designed to beat the grog);
- Sports and Recreation Services include after-school kid's activities, bush community trips, circuit classes, discos, drop-in centre, junior football, soccer, netball, fully equipped gym, holiday programs and national Aborigines' and Islanders' Day Observance Committee (NAIDOC) events and Women in Sport and Recreation (WISAR) weekend activities; and
- Anyinginyi Arts.

Medical officers at the clinic bulk-bill all patients. The clinic raises some $120,000 per year through Medicare funds and is further supported by funding from Anyinginyi Congress. The Commonwealth Government funds ACAC through the Office of Aboriginal and Torres Strait Islander Health (OATSIH).

The services provided by Anyinginyi Congress demonstrate that it is geared to providing a holistic approach to health. An evaluation may be necessary to identify the areas of weakness or deficit in order to define a model for prevention, screening and intervention that would be acceptable and meet the needs of the community. Nevertheless, the basic requirements for a prevention model are already in place and it is grounded in a solid philosophy. There is substantial evidence that the community feels strongly about retarding the progression of renal and chronic diseases in the Barkly Region.

Julalikari Council is an Aboriginal community-controlled organisation that provides many social welfare and other support services for the Indigenous population of Tennant Creek. Commonwealth funding such as the Supported Accommodation Assistance Program (SAAP) and Home and Community Care (HACC) supports many of the programs.

Its services include:

Health Infrastructure Priority Projects (HIPP) - building houses for the aboriginal community and provides employment and training in the building industry;

Housing - providing affordable and appropriate housing for aboriginal community, Julalikari's program of acquiring and upgrading housing in 10 town camps has resulted in the council owning over 100 houses;

Women's Program - has representative on National Women's Indigenous Advisory Council, has programs on teenage pregnancy, domestic violence and sexual assault, employs a domestic violence counsellor, an Aboriginal Support Worker and a Sexual Assault Councillor and runs a child care centre;

Workshops - Julalikari is a non-funded corporation and is the major training organisation for the building and construction industry and actively pursues building contracts from the government and non-government organisations (NGO);
Night patrol - a successful program imitated by many other communities in NT and Australia, this involves ten people from each town camp on night patrol rosters;

Community Development Employment Program (CDEP) - employs 200 people for town camp maintenance, construction, garden maintenance, landscaping, recycling, nursery work, brick making, wood carting, art work production and there are short courses and trainee ships available through skills development programs;

Homemakers and Home And Community Care (HACC) - provides physical and financial assistance through networking with other organisations: meals on wheels; social and welfare work; palliative care; shopping; transport; aged care support; budgeting; preventative health training program; staff training; environmental health; arts and crafts; personal care; house cleaning; help with home management skills and home economics and respite assistance;

Disability Support Service - provides independent living skills, supports accommodation for long term clients with multiple disabilities and assists clients with community access, organises training programs (Open Employment Program), maintaining traditional skills and offers short-term respite care;

Land management - runs nursery, egg farm and hydroponics farm and offers advice to outstations on improved land management practices; and

Nyinka Nyunyu - cultural centre.

The services catered for are not just support services; they also provide employment, training and education for community members. Again, the extent to which these services are utilised has not been assessed, but they provide a strong platform for improvements to be made in the social and economic determinants that negatively affect health.

9.4. Considerations in Providing Local Services

The social and economic ramifications of relocating people for treatment have been discussed elsewhere but it is important to note that:

- the immediate and extended family are also adversely affected;
- the removal of key members further fractures communities; and
- there is an increased burden on urban community resources and social support services.

Health services are also adversely affected by the burden of acute admissions resulting from

- delayed presentation;
- frequent episodes of non attendance ;and
- emergency evacuations as a result of extended community visits.

The benefits of providing services in Tennant Creek include:

- the majority of the Barkly Region clients would be able to return home and while some may not be able to live in their own communities they would be within a 3 hours drive. This would reduce the non-attendance and acute admissions due to extended community visits;
- accessible services are likely to increase the number of people who accept treatment, and those agreeing to treatment earlier, which will reduce acute admissions and additional care resulting from the increased severity of people's co-morbidities due to late presentation:
  - most of the Tennant Creek clients dialysing in Alice Springs would be able to achieve a suitable level of independence or minimal care therefore requiring minimal supervision;
  - Alice Springs has already trained an AHW in renal dialysis and others could be trained with the specific aim to staff the Tennant Creek unit;
• staffing could be shared with AHW and RN on a 1:4 ratio which would allow more dependant but medically stable clients to return home;

• the need for support services such as Allied Health Personnel and community services will be reduced once clients are in their own communities; and

• overheads related to increased staffing for training and education may not apply to the satellite unit.

Experience has demonstrated that there needs to be in place clear guidelines, contingency plans and strategies covering the location, support services and management before a remote renal facility can be established.

9.4.1. Location

Self-Care Dialysis attached to the hospital

Self-care dialysis implies complete independence and the presence of a buddy or partner trained in haemodialysis committed to attending all treatments. In these situations trained staff are not usually supplied though hospital staff are available in emergencies. Self-care dialysis attached to a hospital or clinic limits the number of clients able to dialyse by virtue of the allocated space and lack of supervision - usually restricted to two. More than two people sharing a machine leads to confusion regarding responsibility for ordering of stores, cleaning of machines, water sampling and testing.

Given the number of clients relocated from the Barkly Region to Alice Springs this is not a preferred option. In addition:

• several of the Tennant Creek people dialysing at Alice Springs are minimal care and similar to the Tiwi people in that they are independent with their dialysis but require help with fluid calculations or needling;

• no-one from the Barkly Region has a buddy and it is clear from brief discussions that though most would be able to identify a close family member, they would be unable to make a commitment on their behalf to training and regular attendance at dialysis;

• the trend away from establishing in-centre facilities is nationwide due to the cost implications; and

• there is a perception that in-centre dialysis is for sick people and healthy clients ‘getting on with their life’ undertake community dialysis.

Satellite Services

Satellite dialysis services have many forms and can range from the complete renal care and training as delivered by Flynn Drive and Nightcliff to the more independent facilities that were once offered in southern states. The current reality however, is that the majority of satellite units (and certainly all that were contacted) now take a mixture of independent and dependant clients. The unique model used on the Tiwi Islands offers complete renal care with the RAHW or RN also providing treatment and support for the PD and Transplant clients in close liaison with the Nephrologist and nursing staff at Nightcliff.

A number of sites have been suggested for the facility including:

• a stand-alone unit within the hospital grounds;

• refurbishing and restructuring of one of the following sites within the hospital;
  • Community Care Area;
  • Day Surgery Area;
  • Paediatric Ward;

• A Housing Commission house within the Tennant Creek community; and

• Setting up within the grounds of Anyinginyi Congress.
A brief visit to the potential sites immediately discounted four areas. All sites within the hospital were not considered appropriate due to:

- the need to relocate the services currently occupying the area;
- the substantial refurbishment and restructuring required;
- the limited potential for future expansion as the sites are confined by other structures; and
- the possibility that the sites will not meet recommended OH&S space requirements for dialysis units.

The possibility of refurbishing the Housing Commission house was also discounted for similar reasons in addition to it being unable to fit more than three stations.

Stand-alone facilities within the hospital grounds or within the confines of Anyinginyin Congress grounds are possible if the will of the organisations remain unchanged.

The people who need treatment (People with ESRF)

Service providers and people on dialysis need to agree on the level of independence and health they will attain and maintain once they return from Alice Springs. In isolated areas this is integral to maintaining a safe service for all, including staff. It is helpful to have guidelines covering, for example, attendance, fluid gains between dialysis, respectful staff/client relations and identified cultural protocols.

There is likely to be an element of fear for all involved during the initial stages of operation and additional support may be required until confidence and skill reaches adequate levels. This was the experience at the Tiwi Dialysis Unit, where after one year, staffing was reduced on one of the shifts to the RAHW, who helped six people with their treatment. The task was made easier by the presence of three buddies who accompanied their spouses. Six people on the other shift, however, did not have buddies and so staffing levels could not be reduced as quickly.

The ability of clients to develop the confidence and skill to attend all of the treatment themselves is largely dependent on the skill and confidence of the health staff. The burden of responsibility of self-care is heightened when clients do not have confidence in the staff. Only experienced staff, with a well-developed sense of humour, were sent to Nguiu due to the isolation and the propensity for things to go wrong. If the staff are “unflappable” the clients will continue to gain confidence in their own ability. Conversely if the staff themselves are clearly not confident in delivering treatment and continuing educating, then the clients ability to self-care will regress.

The Buddy

The buddy is usually a spouse or close family member who has agreed to train with the client to learn how to use the machine and attend each dialysis session. A buddy’s willingness to spend three days a week with someone on treatment is ample evidence of their commitment. It is a big ask and apart from spouses few are able to maintain this commitment. In addition, there are recognised relationship issues, such as the dependency of the client on the buddy, as well as cultural issues around the appropriateness of suggested buddies and their willingness or ability to decline. Consideration needs to be given to the pressures and responsibilities already being experienced by the suggested buddy as in many communities blame and avoiding blame will be an issue.

The RAHW

Renal training of AHW is a new development and the Northern Territory is the first to successfully manage it. The training program is delivered under DH&CS and AHWS in both Darwin and Alice Springs have been trained. The program pre-requisite is AHW Certificate 3 or at least two years clinical experience. The course will require adjustment as more health workers enter the program and this necessitates a certain degree of flexibility in the training schedule. Evidence from both Nightcliff and Flynn Drive suggests that AHWS will require additional support and training time to gain the skills and confidence to manage the dialysis treatment on their own.
There is also evidence that some AHW may have difficulty working in their own communities due to the cultural issues surrounding gender roles, relationships with Elders (particular for young women health workers) ‘skin’ and avoidance relationships. In the case of the Tiwi Dialysis Centre, attempts to train local Health Workers were unsuccessful for a number of reasons and in the end the RAHW trained to work in the facility was from another community. As was anticipated and can be expected, there is less stability with non-local Health Workers as they are more likely to move on to another community or return to their own.

Staffing Ratios

Staffing specialised areas is always problematic; there is a recognised national shortage of trained renal staff. Staffing remote/rural facilities with specialised staff is difficult and exacerbated by high levels of transience. This has been the experience at the Katherine Dialysis Unit and maintaining a skilled and experienced work force is time-consuming and costly.

Training of permanent or long time staff from the Tennant Creek Hospital should be pursued, however while other contingency plans are investigated. A period of relocation to Alice Springs will be necessary in order to receive adequate and sufficient training. Registered Nurses, Enrolled Nurses (ENs) and AHWs should be considered for training and while ENs are legally required to work under a RN, they remain a cost efficient alternative to an AHW.

Staffing for a satellite facility with 16 clients dialysing 8 per morning will require 2.5 full time equivalents (FTE) or 3 staff in order to cover holidays. Maintaining a local renal trained work force of 6 staff who are rotated through the wards of Tennant Creek Hospital or Anyinginyi Congress would provide enough staff to cover annual leave, sick leave and emergency leave. This arrangement would offer sufficient variety and interest in the work to retain staff. It also allows for staff to be on hand for hospital dialysis if necessary.

Other strategies to be considered include:

- Developing a rotation system of 1-2 months transfer to Tennant Creek with other dialysis units from Alice Springs, Darwin or Adelaide and other interstate facilities. Nightcliff has already undertaken a rotational program with Adelaide and Alice Springs. It is believed the establishment of a rotational program will assist with the lack of experienced staff in the Territory while providing opportunities for both groups of staff to experience service delivery from another viewpoint.

- Requesting as part of the tender that the dialysis manufacturers take over the management of the facility including staffing. They have greater access to trained staff from interstate and are able to offer incentives to attract staff to the area, even if it is for short contracts. Cultural awareness education and training need to be incorporated into the tender document. This option does not discount the company from employing local trained renal staff to work in the unit.

Staff and Client Safety

There are safety issues that need to be considered with stand alone units: security after hours and when the facility is not in use; safety for people returning home after evening sessions; and access to emergency assistance. Managers need to ensure their staff and clients are able to travel to and from the facility without danger. While they obviously cannot guarantee it, they can create a safer environment by such strategies as:

- having enough space and stations in the dialysis facility to eliminate the need for evening shifts which will also reduces expenditure in terms of penalties rates

- limiting the potential for emergency situations by restricting the unit to people who are medically stable and regularly reviewed by the nephrologist

- installing emergency bells or telephone links to the nearest medical facility to alert clinic staff that assistance is required. The Tiwi Dialysis Centre has a dedicated telephone line that initiates a distress call to the Health Clinic without the need for the operator to talk to the person answering the phone.
Renal Supervision

Dr Kirubakaran already provides significant support in the way of renal services to the Barkly Region. He visits the area on a six-weekly basis and is often accompanied by the Renal Outreach Team who provide support and education to people with renal disease in the Barkly Region. Medical staff from either the hospital or Anyinginyi Congress (or ideally both) will require education and training in renal care. It would be useful for them to visit the dialysis unit in Alice Springs to learn the intricacies of haemodialysis. The standard of care will need to be monitored by experienced renal nursing staff and this could be managed with monthly visits from Alice Springs, as is the case at the Tiwi Dialysis Centre, which has regular visits from Nightcliff.

Acute Care

Returning people with ESRF to their communities involves laying clear guidelines and strategies in the event acute care or emergency dialysis is necessary. Minimal staffing levels in the satellite unit usually means staff are unavailable to attend acute dialysis when needed, resulting in extended waiting times, unsafe staff ratios and excessive overtime for the RNs. Moreover staff may feel they do not have the experience or skills to competently undertake emergency treatment. Whether or not to provide acute services is a decision that needs to be made prior to the establishment of the facility and with the full knowledge of everyone affected by the policy.

Insisting clients adhere to attendance times, fluid, diet and medication regimes can reduce the need for emergency treatments. Even so there is no way to prevent unforeseen occurrences and the development of conditions unrelated to the dialysis treatment. This was evident at the Tiwi Dialysis Centre, where client compliance was 100 per cent with an apparent improvement in health, yet there were a number of acute admissions due to fistula, cardiac and bowel problems.

The ability to attend acute dialysis would be beneficial, as it would reduce expenditure associated with emergency evacuations. Guidance and support could be offered by 24hr phone contact with the On-Call RN and nephrologist in Alice Springs, at least in the initial phase. Maintaining an adequate renal work force and providing opportunities to rotate and re-skill will assist the staff to gain the experience and confidence required.

Community Support

People with renal disease who have to relocate to the urban area for treatment require a considerable amount of support, as demonstrated by the need to employ full-time Social Workers and Aboriginal Liaison Officers in both Alice Springs and Darwin. Much of the support is associated with relocating and it is believed (and demonstrated in the case of the Tiwi people) that lower levels of support will be needed when people return to their own communities. As was the case with Tiwi and Katherine, however, there will be a settling-in period during which people need to be encouraged to seek assistance from the local support services when required. Julalikari provides many support services to the people of Tennant Creek such as housing and social services including assistance with budgeting, transport and shopping.

There will be a number of people in the Barkly who will not be able to return to their communities, such as those from Elliot, due to the distance from Tennant Creek, and accommodation will need to be provided locally. Unlike Katherine, the majority of the clients come from Tennant Creek and those that do not live within a two to three hours drive, which makes weekend home visits logistically and financially achievable.

Prior to the establishment of a satellite unit, all stakeholders need to discuss the issues of adequate housing, client transport to and from treatment, access to support services and the potential increased burden on local medical services. Regular collaboration and detailed negotiation is essential if workable guidelines are to be devised for managing the treatment of people with ESRF effectively (see Carney 2000).
9.5. Management and Funding Scenarios for Delivering Renal Services

Renal dialysis is a high volume, high cost specialty. The incidence of renal failure is on the increase nationally especially amongst Aboriginal people and expenditure on treatment as noted by Kneipp (2000), is likely to continue to climb. In the NT the prevalence has increased annually by 15 per cent after an initial dramatic increase of 36 per cent. The national increase in prevalence is between 6 and 8 per cent.

Providing accessible and equitable services to the people in the NT within a finite budget is a challenge, but one that is achievable if lessons can be learnt from other states. The delivery of accessible tertiary services should be in the context of community consultation and coordination of screening, prevention and educational programs.

The final site for the facility will depend on which organisation has responsibility for managing the program. Management can pertain to organisational, financial and clinical control with each area being managed by the same or different bodies. This model has been implemented to various degrees in WA and is particularly attractive to organisations wishing to reduce the risks associated with establishing and maintaining services in remote or rural areas.

9.5.1. Possible Service Options

Traditional model of financial and managerial control

Financial and managerial control remains with DHCS. The satellite facility is directly funded and managed either through Tennant Creek Hospital (similar to Katherine Hospital) or Alice Springs Hospital as in the case of Tiwi Dialysis Centre. Infrastructure, capital expenditure and recurrent funding responsibility belong to DHCS.

Outsourcing sections or areas of dialysis services to a private provider

Many private dialysis companies operating in Australia are moving into the field of ‘Renal Care Service’ or ‘Managed Care Facilities’. The manufacturers agree to supply all or most of the structure and support services required to establish and maintain a service. This can be extended to include support and nursing staff but usually does not involve medical staff. Midlands and Melville satellite units in WA are examples of this model. Clinical control is left with the main hospital and their nephrologist. Evidence suggests that the quality and standard of dialysis service is affected if the ‘for profit’ company itself employs the clinicians (nephrologist and nurses) (Renal Physicians Association/ American Society of Nephrology, 1999: 577).

Expenditure is known and is either based on a set price per treatment or a minimum payment per month agreed to at tender. The health service does not incur the risks related to capital expenditure, budget overruns, extended time frames, contingencies and even recruiting staff.

A number of dialysis manufacturers have been asked to submit proposals for a potential site in Tennant Creek. The proposals are attached in the appendices along with a summary and assessment of the submissions.

Transferring Financial and Managerial Authority to Community Health Service

There is a trend within the state and federal governments to increase the autonomy and authority of community health services by funding them directly. The Coordinated Care Trials in Tiwi and Katherine are an illustration of this. It is theoretically possible to redirect funds from the renal budget to a community health service, on the basis of a number of treatments for an agreed price. To date none of the community groups entering trials have negotiated for tertiary renal services but the possibility is there and would allow the communities to deliver services based on priorities and needs in a culturally appropriate manner.

Additionally, identified funding can be transferred from hospital services to community organisations, in particular Aboriginal Medical Services, in order for them to manage the renal service according to their needs. Performance indicators and price per output/outcomes would be agreed to in the negotiation phase. This model is about to be implemented in Broome where the Kimberley Aboriginal Medical Service will receive funding from WA Health to purchase dialysis services for the people of the Kimberley.
Table 9 Source: ANZDATA Interim Report 2000 and DHCS (author) following on page 72, 73, 74 & 75.

Legend

- n/ab : non-Indigenous client
- P : private facilities
- ab : Indigenous client
- b : buddy
- * : Originally set up to be self-care but unable to remove staff due to failure of buddies (n/ab) to remain.

Explanatory notes: All major training centres contacted identified the difficulties associated with home dialysis for Indigenous clients. These ranged from inability to achieve desired level of self-care, reliability of buddies, home environment and adherence to prescription.

All satellite units are staffed regardless of client numbers or ethnicity.

All major hospitals and most smaller facilities interstate have a significant number of in-centre clients unlike the Territory Victoria and Tasmania were not contacted regarding Indigenous clients in remote services, as their numbers were small or non-existent (see Figure 3, Section 2) and the relevance to the NT was not considered significant.

When comparing staff ratios of satellite facilities, the Tiwi and Dialysis Centre and Katherine Dialysis Unit appear to be at the two ends of the spectrum. TDC has a staff ratio of 1:5 while KDU currently has a ratio of 1:2.
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10. Bibliography

ANZDATA Registry Interim Report. 31/3/00. Australia and New Zealand Dialysis and Transplant Registry. Adelaide, South Australia.


Bird Cameron Chartered Accountants. 1999. Costing Analysis of the Renal Dialysis Services Funded by the Health Department of Western Australia. Perth: Health Department of Western Australia.


Diabetes Ambulatory Care Reform Project (DACRP). 1996. Costing Study, Haemodialysis Cairns Base Hospital Renal Dialysis Unit. Cairns: Cairns Base Hospital

Draper, M. 1997. Involving Consumers in Improving Hospital Care: Lessons from Australian Hospital. Canberra: AGPS.


Kneipp, E. 2000. Purchasing Renal Dialysis In Western Australia. Perth: Health Department of Western Australia.


Mahoney, J. 1995. Tiwi Islands Dialysis Feasibility Study. Darwin, Menzies School of Medical Research.


Wright, Alexis 1998 The Grog War Penguin Australia


11. Appendices

11.1. Expressions of Interest - Tennant Creek Renal Dialysis Facility - Baxter, Gambro and Fresenius

11.2. Assessment of Manufacturers submissions for establishment of Tennant Creek Renal Services
Dear Gillian,

Baxter Renal Therapy services appreciate the opportunity to put foreword a proposal for the establishment of a community based dialysis unit in Tennant Creek Northern Territory.

The pricing is based on 2 models:

- **Pricing model one (1) without staff this is $195 per treatment**
- **Pricing Model two (2) includes staff this is $275 per treatment**

Please note that these prices do not include GST and are for a contract period of five (5) years for a total of 41,968 treatments with a roll over option for the same period. We have attached a proposal with some background information outlining the assumptions. The prices offered in this proposal are valid for 60 days.

Should it add value to the proposal to see at first hand Baxter’s capability with regard providing dialysis in a community based setting, we can arrange a visit to our Midland Dialysis Unit in Western Australia at a mutually convenient time.

We have fully explored this proposal and consider that Baxter has the capabilities and commitment to this unique project. Please contact me directly if there are any matters in this proposal that require clarification. I am available to attend any presentations that may be required as a result of this submission.

Yours sincerely,

Sue Evans
National Manager Renal Therapy Services

Cc: Grant Rudman, Bradley Keam

Baxter Healthcare Pty Limited
A.C.N. 000 392 781
9 - 29 Syme Street
Brunswick VIC 3056

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P.O. Box 71
Brunswick VIC 3056

Facsimile: (03) 9381 2257
Sue Evans – National Manager RTS
Direct Line: (03) 9389 3061
Mobile: 0419 419 778
Email: sue_evans@baxter.com

Saturday 14th October 2000
Ms Gillian Gorham
Project Coordinator
45 Cummins Street
Rapid Creek
NT 0810
Proposal

For

Tennent Creek

Prepared October 2000
Summary

Baxter RTS have considered this proposal in depth, we fully appreciate the need and importance to bring services to where the patient is so as to minimise the disruption to both them and their families' lives. The proposed site offers a wonderful opportunity to integrate a freestanding dialysis service with the Aboriginal Medical Service this allows the dialysis service to share facilities and to reduce the building costs.

We have based our building requirements on the assumption that the dialysis service will share some of the amenities but be fully independent to deliver the dialysis procedure. The degree of sharing will extend to the open waiting area, staff room, some office storage, main storage area, toilet facilities and parking.

The area currently allocated in the building is approximately 156 sq metres we believe to provide a suitable area for 8 dialysis points including minimum support areas is 200sq/metres, we understand that it will not be a major problem to provide this area in the building.

Our design will include:

- 8 Dialysis points
- Water Treatment area
- Servicing area
- Nurses Area
- Office area /staff refreshment area
- Patient waiting area
- Disabled Toilet and shower
- Examination Room

We have considerable experience in the design and the building of dialysis units. We fully appreciate the need to comply with building standards as well as meeting design requirements for dialysis and infection control. Dialysis units must be built and laid out such that they create a non-threatening environment for patients and families. We appreciate the need to consult with the appropriate personnel to ensure that the area would work well and be consistent with local requirements.

This unit would be classified as a remote facility however Baxter has commitments Australia wide to all types of health facilities that are both city and remote. We understand the degree of commitment required to either manage a facility such as a dialysis unit in Tenant Creek or to supply consumables and equipment support. We would work in a participatory manner with all stakeholders.

Background

Baxter Health Care RTS have developed the offer from information in:

- Attachment 1
- Site Visit to Aboriginal Medical Service Tenant Creek
- Discussion with staff at the service and in particular Dr Randall Davis
- Discussions with Ms Gillian Gorham
- Site visit to the proposed property
- Discussions with local service providers
- Plan review by the RTS architect
The price is based on opening patient numbers of 1248 treatments per year increasing by 5 patients per year. We have estimated that patients receive on average 146 procedures per year as they have re-admissions to hospital.

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<td>Price per treatment $195</td>
<td>Total Price per Treatment $275</td>
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Note: Prices do not include GST

Assumptions

Pricing

We have fixed the price for 5 years on the presumption a total of 41,068 treatments will be reached, if the treatment number is reached before 5 years, then the contract, will have been fulfilled.

Building costs

It needs to be appreciated that this price is based on estimates for building and maintenance, cleaning etc and does not take into consideration that lower prices can be achieved when the work is tendered out. There is also ability to share cleaning, energy and insurance costs. It is most likely that the price will reduce when a firm proposal can be fully developed and the time taken to fully explore all opportunities to reduce these costs.

Air conditioning unit capacity

We have not been able to undertake a comprehensive mechanical site inspection but have assumed that air conditioning unit can take the load that will be generated from the dialysis area. Dialysis units normally generate more heat loads than office areas, however we would believe because of local weather conditions that buildings would normally run on excess capacity not marginal. If a major upgrade to the infrastructure of the air conditioning unit was required this may change the price depending on the scope of works.

Staffing

Staffing costs have been based on the ratios that are nominated in the requirements, however we have added in an administrative support person as dialysis units have to maintain detailed records and it is important that clinical staff are not taken away from patient focussed activities to perform non-clinical work.

Management

RTS units like the one proposed in Tennant Creek are the responsibility of the Renal Therapy division reporting directly to the National Manager of Renal Therapy Services Miss Sue Evans who has had over 30 years experience in the management, design, building and running of public dialysis units. The RTS units have access and are supported not only by the Renal division but also by all of the departments that would be considered essential to the running of the unit See Organizational Chart RTS Attachment 2
Price basis

The prices offered will remain firm for 12 months from the commencement of the patient treatments and thereafter will be adjusted by the following:

- The agreed price index for the purpose of price variations shall be the Consumer Price Index table 6401.0 - sub group “Health and Personal Care”. In the event that the change in this index exceeds 3% in any year, the price increase will be limited to no greater than 3% in any given year. Because of the competitive pricing offered, a drop in the CPI will not result in a price decline. Price variations for these products shall vary in accordance with the following formula:

\[
RCP = CP \times \left(\frac{I_0}{I}\right)
\]

Where

- \(RCP\) = Revised contract price
- \(CP\) = Latest contract price
- \(I_0\) = CPI table 6401.0 - sub group “Health and Personal Care” published for the quarter closest contract to the adjustment date.
- \(I\) = CPI table 6401.0 - sub group “Health and Personal Care” published for the quarter closest to the contract signing date.

Contract period

Baxter offers a five- (5) year contract with a rollover option for the same period.

Equipment ownership

All the equipment and fit-out used in the delivery of the therapy and purchased during the contract, including the haemodialysis machines, reverse osmosis water plant and water pre-treatment plant and other furniture and equipment will be fully written down and will transfer to the provider.

Haemodialysis machine requirements and utilisation rates

Typical each haemodialysis machine can be used at least twice a day to fully utilise the capital investment in the equipment, maximise patient numbers, and create efficiencies with staff. Therefore each machine station can dialyse 4 patients and these are the ratios that have been used for the pricing models.

Haemodialysis Equipment Dialysis Products

Equipment

We have based our costing on the inclusion of Althin Dialysis Equipment for Dialysis. The equipment will be of a sufficiently high specification to provide bicarbonate dialysis, volumetric control and single needle dialysis, as these provide the most up to date treatment options. Baxter employs a Technical Service Manager who has overall responsibility for our servicing department and is responsible for all our equipment. He will arrange the installation and in-service training of any new equipment and provide full preventative maintenance and emergency technical support. All equipment supplied will be year 2000 compliant.

In the event of equipment failure the failed machine will be replaced by one of the (2) two spares and a service call placed immediately. The service agreement between the equipment supplier and Baxter RTS will specify complete repair within 24 hours or a loan machine, with equivalent features and treatment modalities, will provided.

The equipment will be serviced at regular and timely intervals according to and in compliance with the manufacturers recommendations.
Water treatment

Reverse Osmosis Water Treatment: The RO will be equipped with dual pressure pumps and circulation pumps. If one pump fails the other pump will be immediately started. As part of the normal operation of the unit the pumps will used alternatively ensuring their continued operation.

In the worst-case scenario the RO can be bypassed and filtered clean water will be distributed to the dialysis machines. In this case patients would only receive a maximum of one treatment using filtered water only. High flux dialysis will be suspended during this period; patients will have the choice of using an alternative dialyser or going to another centre to receive their dialysis during this period.

The quality of the water used in the unit for haemodialysis will meet if not exceed the Association for the Advancement of Medical Instrumentation (AAMI) International standard.

A programme and procedure for regular routine water sampling for analysis of bacteria levels and endotoxins will be in place in line with practice at other RTS centres; a full preventative maintenance contract will be agreed with the supplier. We recognise that Toowoomba water may require a specialised pre-filtration unit.

Haemodialysis Consumables

Dialysers

Dialysers proposed are from the Baxter range of medium compatible high performance low and mid flux dialysers made from modified cellulose diacetate and benzylcellulose membranes. The Polysynthane (PSN) and Dicea dialyser is currently in use in all our centres.

Haemodialysis consumables

Baxter RTS will supply all the direct consumables required for haemodialysis, that is a haemodialysis pack, bloodlines, concentrate, saline and basic ancillaries.

A fixed percentage of product losses would be built into the price, eg a bloodline could clot requiring replacement. Baxter would allow a fixed number of bloodlines and other consumables to be replaced without charge to RTS. If this fixed number would be exceeded, an incremental charge would be made.

Haemodialysis concentrate

The “B” component of Bicarbonate dialysis will be delivered using dry sodium bicarbonate powder and the “A” component will be liquid, a full range of liquid concentrates will be made available according to the dialysis prescription.

Consumable supply

Baxter will warehouse 2 months stock at our warehouse staff will maintain 1 to 2 weeks of stock in the unit and a larger stock holding can be held in the store in the Tennant Creek facility.

Dual lumen catheters for haemodialysis

These are for acute dialysis or when a patient requires a temporary access they are available but not costed in but available

General equipment

We will supply computers, photocopier, printers, fax, weigh scales general office furniture for all areas, furniture for the staff and waiting rooms.
**Dialysis chairs**

We propose to use the Thompson Dialysis chair from Artistic Healthcare Seating; this chair is the benchmark in the country for dialysis treatments. It is fully height adjustable and can go into the Trendelenenburg position (for management of a code blue). Wheelchair patients can transfer to the chair with ease. It is designed to be fully operational by remote control by the patient; this chair virtually eliminates all of the OH&S issues related to Staff carrying out the procedure of dialysis.

**Operating experience**

For 15 years Baxter Renal Therapy Services have developed successful partnerships with the National Health Service (NHS) in the UK to provide dialysis centre management services in a constantly changing health care market. The relative similarities between the delivery of healthcare in Australia and the UK make this experience invaluable in the establishment of joint ventures in the Australia. Baxter's Australia operation will leverage the expertise developed in the UK to develop and manage RTS venture. By investing capital and expertise, Baxter has worked with Hospitals and Purchasers to develop renal centres in areas of under provision where patients may previously have had to travel long distances for their treatment.

Baxter currently operates 5 dialysis centres in the UK offering a range of integrated high quality services. Bangor (since 1985) and Ipswich (since 1987) provide a full range of dialysis services - PD and HD as well as chronic and acute. Our units in Cardiff (since 1989), Merthyr Tydfil (since 1989) and Newport (newly opened in May 1998) provide satellite HD services only. A new satellite 20 station HD centre is due to open later this year in Bristol. We have the experience to be able to provide the exact range and level of services required by our customers.

During the past 2 years all these UK contracts have been competitively won or retained. New purpose built, state of the art facilities were completed at Bangor and Ipswich last year while the new facilities at Newport and Bristol have been built this year.

The establishment of these centres has had a positive influence on the host hospitals and surrounding community in many ways, the most important of these being:

- Patient choice - the full range of dialysis treatment options are available locally.
- A local renal centre increases awareness of renal disease and its treatment among primary health care workers and the community thus increasing patient referrals and take-on rate.
- In the hospital many more people within the multi-disciplinary team have increased their knowledge and their ability to care for these patients.

These developments are particularly important for the long-term future of the treatment in each area. All the Baxter centres have a strong commitment to help promote knowledge of renal disease, dialysis and transplantation amongst other disciplines both in and out of the hospital environment.

**Midlands -Western Australia**

Baxter were successful in winning the first tender to provide a complete dialysis service to the public sector i.e. provision of staff, building and consumables for a period of 7 years with a roll over option of 7 years. The unit is based in the suburb of Midlands Perth the unit will ultimately support 48 patients currently there are 32 patients dialysing in the unit. The unit has been operating as an independent satellite unit since April 2000; patients are from The Royal Perth Hospital and are clinically managed by the consultant nephrologists of that unit, a similar model is proposed for Tennant Creek.
Background

Baxter Health Care RTS have developed the offer from information in:

- Attachment 1
- Site Visit to Aboriginal Medical Service Tennant Creek
- Discussion with staff at the service and in particular Dr Randall Davis
- Discussions with Ms Gillian Gorham
- Site visit to the proposed property
- Discussions with local service providers
- Plan review by the RTS architect

The price is based on opening patient numbers of 1248 treatments per year increasing by 5 patients per year. We have estimated that patients receive on average 146 procedures per year as they have re-admissions to hospital.
Attachment 1

Dialysis Requirements for Tennant Creek

Tennant Creek currently has 16 patients relocated to Alice Springs in order to have dialysis treatment. It is envisaged that there will be an average of 5 new patients per year from Tennant Creek, which will be offset to some extent by the high attrition rate due to death and transplantation.

It is the aim of this research proposal to present an attractive scenario to the NT Government. This requires reducing the risk to the health service in terms of unexpected expenditure and the need for contingencies. In addition it is hoped that the local Aboriginal Medical Service - Anyinginyi Congress - will be suitably funded in order for them to manage the service. The employment of local staff as clinicians and support personnel is a priority and access and assistance to appropriate training must be catered for.

Assumptions

Clinical control will remain with the Nephrologist from Alice Springs and the Medical Staff of Anyinginyi Congress.

All renovations and refurbishment required to bring the site to suitable standard is the responsibility of the Renal Company.

Site remains the property of Congress and is either leased to the renal company or deductions are made from the price per treatment. This should be evident in the calculations.

Contract should be for a period of 5 years with the option to renew.

The First price should include:

Renovations to the identified site to include:

- a small waiting area,
- male and female toilets, separate from the dialysis area, if not catered for in the complex
- a staff kitchen,
- a technician room suitable to hold 2 machines and run up one
- a raised nurses station positioned to allow satisfactory viewing of all client
- 8 dialysis ports on main floor and one in technician room
- Store room sufficient to hold one months stock

Equipment required:

- a main RO and filtration system
- 9 dialysis machines one of them to be a double pump machine
- 9 dialysis chairs
- 9 patient trolleys
- 2 TV’s positioned from ceiling
- Computer, printer, phones, faxes, fridge
- Emergency trolley
All consumables:

- including those associated with dialysis procedure minus pharmaceuticals such as heparin and lignocaine
- Catering of one sandwich and piece of fruit per patient plus tea, coffee and milk
- Electricity and water charges
- Financial responsibility of timely delivery of stock
- Maintenance of internal building and all equipment
- Internal and external insurance
- Treatments based on minimum of 1248 treatments in the first year. Price should be volume sensitive, as treatment numbers rise, price per treatment decreases.

A second price should include:

Staff ratio based on 2 staff per 8 patients. Aim is to have at least one staff member a Renal trained AHW Level 3 initially, moving to level 4 once satisfactory completion of competencies RN L2 moving to L3 as patient numbers increase.

Included in the price should be an allocation for staff training/conference attendance and patient education particularly in the area of translating material.

For further information please contact Dr Randll Davis 89622385 or Gillian Gorham 89854991
Attachment 2

Baxter Renal Therapy Services

Grant Rudman
Business Manager Renal

Sue Evans
National Manager RTS

RTS Clinics

Baxter Regional Office

Baxter Regional Clinical Product Specialist

RTS Units
World Wide

Human Resources Dept & Payroll

Information Systems Dept

Quality Assurance Dept

Technical Services Dept

Customer Service

Product Manager Haemodialysis

Warehousing and Distribution

Finance

RTS clinics have access and support to all Baxter departments and State offices
Thursday, 28 September 2000

Dear

Expression of Interest to Supply Dialysis Services to Northern Territory Health Service

Thank you for the opportunity to discuss the supply of dialysis services to the Northern Territory Health Service (NTHS). We are pleased to submit an expression of interest to supply dialysis services to NTHS in relation to establishment of a renal dialysis unit in Tennant Creek, and to assist you with progressing this project to the next stage.

Based on the brief discussions with yourself, Dr Paul Snelling, and relevant parties of the Anyinginyi Congress Medical Service, it is our understanding that development of a dialysis facility within the current Centre link building has been proposed. The development of the physical infrastructure, assistance in policy development as well as staff training are the areas where Fresenius Medical Care sees that outsourcing could be of major benefit. The following proposal encompasses these areas.

The “proposal”
As part of this proposal, Fresenius Medical Care will be responsible for the development of the area supplied by the Anyinginyi Congress Medical Service for the purpose Renal Dialysis. Fresenius Medical Care will also through a mentoring role with our Hartley facility in Adelaide assist in the development of clinical procedures and protocols specifically tailored to the needs of a service in Tennant Creek. Management and operation of a facility will remain with the nominated party as decided by the Northern Territory Health Service. The number of patients treated within the facility (as high dependency patients or limited care patients) is approximately 16. The type of services to be provided by Fresenius Medical Care within this facility include:

- Provision of dialysis equipment (capital and consumable equipment) required for dialysis, and its maintenance;
- Nursing training;
- Data management of dialysis treatment records and reporting as required;
- Development and implementation of dialysis protocols and procedures;
- Quality assurance procedures;
- Accreditation of the facility;
- Staff (including nurses) management and training;
V Supply of equipment and ancillary services (such as waste disposal, cleaning etc.);

For a basis of calculation of this offer Fresenius Medical Care has included the following level of staff development and training.

V An initial 6 week period of policy and procedure development to be spent with the appointed head of the Tennant Creek.
V 2 weeks clinical training in operational procedures for the appointed dialysis staff.
V Phone support from the clinical manager of Nephrocare.
V Monthly follow up meetings for the first six month period followed by quarterly visits thereafter (it would be envisaged that these follow ups would coincide with the clinical advisory committee meetings).

Fresenius Medical Care would seek a place upon the medical advisory committee formed for the Tennant Creek unit to aid in continuation of support on an operational basis.

The dialysis facility will include 8 dialysis stations (for high dependency dialysis and limited care dialysis) as well as 2 extra machines to allow for continuation of treatment in emergency situations.

The location and identification of the potential site has been made but as yet we have been unable to obtain plans for this area to formulate accurate pricing of the redevelopment costs. Therefore our expression of interest does, include an estimated provision for the internal design and refurbishment (of a shell) into a dialysis facility.

Fresenius Medical Care is able to supply dialysis services for the estimated price per treatment as below. This is based on a minimum of 16 patients for a contract period of at least 5 years. The prices quoted are working estimates and are subject to change depending on the actual specification of the facilities and services required by NTHS.

Full redevelopment and training package including all items on the attached list.
$50.00 per treatment
Provision of all Dialysis hardware (Dialysis machines, R/O, Finesse data management system) and basic treatment consumables as per the current PPT contract with NTHS.
$108.00 per treatment

**Fresenius Medical Care**
Fresenius Medical Care is the world’s largest integrated provider of products and services for patients with end stage kidney disease. Our philosophy for developing haemodialysis and peritoneal dialysis products is to address the therapy demands of the patient to support long term well being. Our philosophy for delivering dialysis is to address the needs of doctors and healthcare providers in delivering this therapy to patients.
The Fresenius Medical Care research and development department is focused on developing products that provide optimum and safe dialysis therapy with long term positive outcomes. Our list of product innovations that subscribe to this concept include:

- stay•safe® system for peritoneal dialysis, designed to make bag exchanges safer and easier for the patients;
- the PD Plus™ concept for APD therapy to maximise dialysis dose for patients;
- the Fresenius Polysulfone® membrane technology for biocompatible and ultrapure haemodialysis and haemodiafiltration procedures;
- The Fresenius haemodialysis machine for the most accurate volume control of ultrafiltration, and incorporating monitoring technology to enhance physiological dialysis.

The focus of our product development program is to enhance the dialysis therapy such that real and long term outcomes can be achieved. This is described in our brochure entitled “BioAdequacy™”

Fresenius Medical Care was formed in 1996 through the combination of the dialysis division of Fresenius AG and National Medical Care Inc. Today, Fresenius Medical Care manages over 1000 dialysis clinics globally, 15 of which are located and managed within the Asia Pacific group of Fresenius Medical Care, including two clinics in Australia.

Should you require further information, please do not hesitate to contact myself. We look forward to your reply with anticipation.

Yours faithfully

____________________
Mr. Ian Mckenzie
Country Manager, Nephrocare
Australia
Fresenius Medical Care Proposed Pricing

- Pricing proposed under this expression of interest is negotiable and may be subject to change based on the actual specification of the facilities and services required.

- Pricing proposed is based on a minimum of 16 haemodialysis patients’ dialysed in a limited care and high dependency dialysis unit.

- The proposed pricing is based on a contract period of 5 years.

- The plans of a potential site are yet to supplied, and therefore the quoted price is indicative of our offer and will be subject to change based on the total capital invested in building and refurbishment. The total capital invested will be amortised over the contractual period.

- Items of medical equipment and furnishings will be amortised over a 5 year period and thus have no residual value. The proposed pricing will include the cost of medical equipment and furnishings.

- The following items are included in the proposed pricing:

<table>
<thead>
<tr>
<th>Proposed Prices</th>
<th>High Dependency HD Unit (Price per dialysis episode)</th>
<th>Limited Care HD Unit (Price per dialysis episode)</th>
<th>Home HD (Price per 12 month period)</th>
<th>Peritoneal Dialysis (Price per 12 month period)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service included in the proposed price;</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Dispensing of dialysis prescription</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Nursing care during dialysis</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Data management and reports as required</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Clinical and practice audits</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Monitoring and coordination of patient test results</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Liaison and coordination with physicians with reference to procedural development</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Patient Training</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Ancillary service such as linen, waste disposal, cleaning, catering</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Maintenance of equipment and facility</td>
<td>✓ Dialysis and IT equipment only</td>
<td>✓ Dialysis and IT equipment only</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Staff (including nursing) management and training</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Preparation for accreditation of facility</td>
<td>✗</td>
<td>✗</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Commercial in Confidence
20/02/03
| Assistance in development of dialysis protocols and QA procedures | ✓ | ✓ | N/A | N/A |
| Supply and inventory management | ✓ | ✓ | N/A | N/A |
| Utilities such as water, gas, electricity | ✖ | ✖ | N/A | N/A |
| **Dialysis Consumables included in the proposed price:** | | | | |
| AV fistula needles | ✓ | ✓ | N/A | N/A |
| Bloodline set for haemodialysis | ✓ | ✓ | N/A | N/A |
| Fresenius Polysulfone dialyser | ✓ | ✓ | N/A | N/A |
| Haemodialysis for bicarbonate dialysis | ✓ | ✓ | N/A | N/A |
| dressing pack | ✓ | ✓ | N/A | N/A |
| priming set | ✓ | ✓ | N/A | N/A |
| Sundry items for general use within dialysis unit eg. syringes, needles, band aids | ✓ | ✓ | N/A | N/A |
| Heparin for haemodialysis | ✓ | ✓ | N/A | N/A |
| IV Saline | ✓ | ✓ | N/A | N/A |
| Stay Safe Peritoneal dialysis solutions | N/A | N/A | N/A | N/A |
| Safe Lock Peritoneal Dialysis solution and Sleep Safe tubing sets | N/A | N/A | N/A | N/A |
| PD ancillaries eg. caps, extension sets, exit site dressing packs, clamps | N/A | N/A | N/A | N/A |
| **Equipment included in proposed price:** | | | | |
| • **Dialysis Suites** | | | | |
| Haemodialysis Machine | ✓ | ✓ | N/A | N/A |
| Sleep Safe automated peritoneal dialysis machine | N/A | N/A | N/A | N/A |
| Automated dialysis chair | ✓ | ✓ | N/A | N/A |
| Bed table | ✓ | ✓ | N/A | N/A |
| Patient scales | ✓ | ✓ | N/A | N/A |
| Water treatment unit | ✓ | ✓ | N/A | N/A |
| Finesse Management System | ✓ | ✓ | N/A | N/A |
| Stethoscopes | ✖ | ✖ | N/A | N/A |
| Blood pressure monitor | ✓ | ✓ | N/A | N/A |
| chart holder | ✖ | ✖ | N/A | N/A |
| television | ✓ | ✓ | N/A | N/A |
| • **Nurses station** | | | | |
| Desks | ✓ | ✓ | N/A | N/A |
| Filing cabinets | ✓ | ✓ | N/A | N/A |
| Chairs | ✓ | ✓ | N/A | N/A |
| Computer and printer, with modern link | ✓ | ✓ | N/A | N/A |
| Telephones | ✓ | ✓ | N/A | N/A |
| • **Waiting area** | | | | |
| chairs | ✓ | ✓ | N/A | N/A |
| coffee table | ✓ | ✓ | N/A | N/A |
### Store

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Verified</th>
<th>Not Verified</th>
<th>N/A</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel trolley</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Linen trolley</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
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</table>

### Clean Utility

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>Stainless steel trolley</td>
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<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Drug fridge</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Controlled drug cabinet</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Infusion pump</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Fluids trolley</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Suction Machine</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Patient tray</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Emergency trolley</td>
<td>✓</td>
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<td>N/A</td>
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</table>

### Kitchen

<table>
<thead>
<tr>
<th>Equipment</th>
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</thead>
<tbody>
<tr>
<td>Microwave</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Refrigerator</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Table and Chairs</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
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</table>

### Dirty Utility

<table>
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<th>Equipment</th>
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<tbody>
<tr>
<td>Linen bins</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Waste disposal bins</td>
<td>✖</td>
<td>✖</td>
<td>N/A</td>
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</table>

### Office/Reception

<table>
<thead>
<tr>
<th>Equipment</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Desk</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Filing cabinets</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Chairs</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Computer and printer, with modem links</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Telephone</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Fax machine</td>
<td>✓</td>
<td>✓</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Ms Gill Gorham  
Clinical Nurse Consultant  
The Nightcliff Dialysis Unit  
182 Dick Ward Drive  
Nightcliff NT 0810

Our ref.: Q324  
27 October 2000

Dear Gill

Please find enclosed our expression of interest to contract for a Price Per Treatment (PPT) arrangement for the supply of dialysis equipment and consumables for the proposed Tennant Creek Dialysis Unit.

The prices offered in this EOI are GST exclusive.

Gambro is well positioned to cater to all your dialysis requirements from the latest technology dialysis machines and central water plants, to the consumable requirements for each treatment.

The dialysis machines offered will be of the latest technology from Gambro. The machines will incorporate the new Gambro Select system – no more liquid concentrates, and the BVS (blood volume sensor) – the dialysis machines are able to monitor water volume in blood as fluid is removed from the patient, lessening the risk of hypotensive episodes.

Gambro is flexible enough to change along with the Tennant Creek Dialysis Unit when it comes to the introduction of new technology and consumable items through the contract period. Please consider this EOI as indicative of what Gambro is able to offer.

We are proposing a PPT contract, the elements of which are completely negotiable and should not be construed as the only option.

I would welcome the opportunity to discuss the proposal and any variations you consider appropriate, in more detail.

Yours sincerely

Peter Harvey  
Northern Area Manager
Gambro Proposes

A Price Per Treatment
for
Renal Services
The Tennant Creek
Dialysis Unit

by

Gambro Pty Ltd
P O Box 1142
Archerfield Qld 4108
Contents of Expression of Interest

1.0 Gambro Pty Ltd, The Company
2.0 Gambro’s Background and Depth of Experience
3.0 Representation in Australia and New Zealand
4.0 Some Considerations for the Establishment of a Dialysis Unit
5.0 The PPT Concept
6.0 Advantages of Gambro’s Involvement in the Project and Indicative Pricing
7.0 Conclusion
8.0 Appendices
9.0 Insurance
1.0 The Company

Name: Gambro Pty Ltd
Head Office: 3 Hudson Avenue,
Address: Castle Hill NSW 2154

Administration
Sales
IT Administration
Cleanroom production for medical devices
Technical Service
Patient Services & Price Per Treatment Administration
Warehousing and Distribution

Principals: Jamie Stokoe,
Managing Director

Graham Burnley,
National Sales & Marketing Manager

Paul Bennett,
Director of Nursing

Graeme Hill,
Financial Controller

Phone: 02 9680 2711
Fax: 02 9634 1375

Other Australian/NZ addresses:
1. Clinic - Chatswood - NSW
2. Solutions Manufacturing - Dandenong, Victoria
   Warehousing and Distribution
3. Sales/Service - Mt Waverley, Victoria
   Patient Services & PPT Administration
4. Sales/Service - Brisbane, Queensland
   Warehousing and Distribution
5. Sales/Service - Perth, Western Australia
   Warehousing and Distribution
6. Sales/Service - Auckland, New Zealand
7. Warehousing and Distribution - Darwin & Alice Springs

Employee N°: 90
1.0 The Company (cont)

Quality Systems
- ISO 9002 accreditation, Sales and Service Sites
- Compliance with the TGA Code of GMP at Manufacturing Sites
- EQuIP at Chatswood Clinic

In addition, we have commenced the introduction of procedures for the implementation of ISO14000, Environmental Standards.

International Affiliation:
Gambro AB
Box 10101
S220 10 Lund
Sweden

2.0 Gambro’s Background and Depth of Experience

Gambro Australia is a private, limited liability company, this year celebrating twenty five years in Australia and New Zealand. As a subsidiary of Gambro AB in Sweden, the Australian company reports to and is part of the Gambro Group of Companies.

Gambro AB has been involved in and has been a world leader, in chronic Renal Dialysis since its inception in 1964. The parent company controls three major international medical companies.

- Gambro
- Cobe
- Hospal

whose combined areas of activity are:

- Dialysis - chronic and acute
- Blood Component Technology
- Cardiovascular Surgery
- Acute Therapy - Critical Care
- Dialysis Clinics

Gambro Pty Ltd controls the Renal business for all three brands in Australia which provides our customers a greater choice of products in our two main areas of activity:

Renal Dialysis - including Haemodialysis and Peritoneal Dialysis

Critical Care - including Acute Renal Therapy Diagnostic and Monitoring equipment and other Critical Care related products

In 1993 Gambro established a new division, Gambro Health Care Services, to consolidate its involvement in offering full dialysis services, through its own clinics. Currently the Gambro Group operates its own dialysis clinics in the following countries where there are in excess of 50,000 patients treated in nearly 600 clinics.
We are able to draw on the company’s global experience as well as our local knowledge to help establish facilities for The Tennant Creek Dialysis Unit.

3.0 Representation in Australia and New Zealand

Gambro was incorporated in Australia in May, 1975 and has provided a service to the Renal community in Australia and New Zealand for the past twenty five years.

Sales and Service are available from five sites, manufacturing from two and dialysis facilities at one.

Most hospitals in Australia, practising dialysis, use products from Gambro as we are one of the few companies offering whole systems; including water treatment, dialysis hardware, disposables, technical service, education, home patient logistics and clinical services.

4.0 Staff Education

The quality of the nursing staff employed in the dialysis unit is critical and we are currently in the process of expanding the Gambro College by employing full time staff to conduct Certificate Courses in Haemodialysis and Peritoneal Dialysis. These educational programs include interactive on-screen presentations, already utilised in our clinics worldwide to ensure a high standard of operators in Gambro run clinics.

These courses can be offered to Tennant Creek Dialysis Unit staff. Please keep in mind that Gambro is a Registered Training Organisation (RTO).

5.0 The Concept

The scope of this offer could include but not be exclusive to:

- Capital establishment cost (building or renovating)
- Conversion costs - plumbing, drainage and electrical
- Capital equipment and other costs such as
  - water treatment
  - machines
  - furniture, dialysis chairs
  - computerised patient and equipment data collection
  - trolleys, ‘crash cart’ equipment
  - scales, lockers
  - televisions
• **Ongoing Hæmodialysis/ Hæmodiafiltration treatment costs including**
  • basic pharmaceuticals
  • disposables & ancillaries
  • support costs, educational and technical services
  • administrative costs

• **Peritoneal Dialysis treatment costs including**
  • CAPD fluids
  • PD200 cycler machines
  • support costs, educational and technical services

All equipment used in the clinic would be maintained according to the manufacturers’ recommendations by qualified Gambro service personnel.

### 5.1 PPT Explained:

Gambro can provide any of the above products and services on a price per treatment basis, over a period of time, based on the estimated number of patient therefore numbers of treatments over the period.

The period of the agreement is only used to estimate an approximate number of treatments to which Territory Health is willing to commit. Taking a few months longer or shorter to complete the obligation is not an issue.

The end of the contract is when the agreed number of treatments have been purchased.

The equipment becomes the property of the local health service at the end of the contract or can be rolled over into a new contract reducing the price of the PPT. Should the latter option be taken up, Territory Health will not have the liability of ownership.

The PPT contract will allocate one part of the treatment that accurately reflects the number of dialyses the unit is performing. In most cases this treatment marker would be the dialyser or the bloodlines. Reconciliation of stock needs to be done regularly.

The dialysis unit would receive only one invoice per month, equivalent to the price per treatment multiplied by the number of treatments performed.

The stock remains the property of Gambro until it has been used.

One advantage of contracting to the number of treatments rather than a specific period is particularly helpful to a growing unit where future patient numbers are difficult to predict.

The PPT is ideal in situations where the health services are stretched for capital. Gambro finances as much of the project as Territory Health is willing to commit to and it is incorporated into the PPT at a competitive interest rate.

The contract can be added to at any time if the needs of the dialysis unit change, as is the case with increasing numbers of patients.
6.0 Advantages of Gambro’s Involvement in the Project

6.1 One Supplier

Being able to supply all dialysis equipment and consumables helps in efficiency of service. All equipment and major consumables are produced by Gambro Group manufacturing companies in Australia and overseas.

If it was felt that a particular patient would benefit from a competitor’s product provision for its use could be made.

6.2 Warehousing & Distribution

Gambro have a Sales and Service office at Archerfield, in Brisbane, manned by clinical and technical staff who currently service The Alice Springs Hospital.

Bulk stocks of consumables are held with Territory Surgical in Alice Springs. This allows for timely and perhaps more frequent deliveries, helping to alleviate possible storage problems for the dialysis unit.

6.3 Experience in the Dialysis Community

Having been established in Australia and New Zealand for 27 years, the company plays a substantial role in the Renal Dialysis Community. Its reputation for quality and innovative products, clinical, educational and technical services is high. Being a subsidiary of arguably the leading dialysis company internationally, Gambro Australia has the resources and backup necessary to service the dialysis needs of The Tennant Creek Dialysis Unit.

6.4 New Technology

Both haemodialysis and peritoneal dialysis are continually going through changes in direction of dialysis modality and process. Because of our substantial investment in Research and Development in Sweden, France, Germany and the USA, The Tennant Creek Dialysis Unit can take advantage of being at the forefront of these changes.

Finally, the standards for dialysis are changing. Gambro is currently supplying and installing highly sophisticated, heat-sterilisable Central Water Plants (CWP) to produce IV quality water for dialysis. A number of these units have already been installed around Australia and meet the most stringent international standards for water quality for dialysis.

6.5 Educational and Clinical Issues

Gambro Australia has 10 Clinical Consultants employed in Australia alone. One of their responsibilities is to provide education and clinical support throughout the Renal community. This involves seminars, in-services, organising visiting experts to liaise directly or through the State Renal Society (RSA) groups.

The Gambro College, an educational tool to keep renal staff up with the latest developments and directions in their field, is offered to all Gambro customers.

We are currently in the process of expanding the Gambro College to employ full time educators to implement already established Certificate Courses in Haemodialysis and Peritoneal Dialysis. These courses will ensure a high uniform standard in the operators employed in our clinics. Gambro is a Registered Training Organisation.

6.6 Future Expansion

If current projections for patient growth exceeds the predicted rate, the proposed haemodialysis facilities could be fully utilised earlier than anticipated.

Further expansion, using a similar mechanism to that being proposed, could include the provision of additional dialysis facilities.
6.7 Machine Replacement and Capital Outlay

The proposed mechanism offers the Tennant Creek Dialysis Unit the ability to take advantage of new release technology. If required, we could incorporate a replacement program which takes into account all machine upgrades and new capital equipment over the contract period.

6.9 State of the Art Dialysis

The proposed mechanism would provide patients at the Tennant Creek Dialysis Unit with the most modern equipment available, the capital for which being outlaid by Gambro.

7.0 Conclusion

In the foregoing pages I have endeavoured to highlight the advantages of a partnership with Gambro and our ideas on how that partnership may operate.

The final costings can be calculated once we know and agree just what components would be included.

I would welcome the opportunity to make a personal presentation and discuss other permutations or explain in more detail our interest in developing such a relationship.

Peter Harvey
Northern Area Manager

8.0 Appendices

Appendix II - Standards

All equipment offered complies with current international standards for electrical safety and dialysis equipment, vis:

- ISO 601-1-16/2
- AS 3200-1-16/2
- Plus complies with Appendix Z of AS 3200
- CWP can produce water for dialysis according to the European Pharmacopoeia

Hæmodialysis Parameters

- No re-use of disposable items will be practised
- Bicarbonate buffered concentrates to be used on all HD patients
- Hæmodialysis Concentrates to be manufactured using distilled water
- Steam/Gamma Sterilised Hemophan Dialysers on all patients
- Steam Sterilised Synthetic Low/High Flux Dialysers
- Water for dialysis conforming to European Pharmacopoeia Standards
- Water distribution loop to be heat disinfected
- All Dialysis Machines to conform to current ISO standards

Other forms of renal replacement therapy can be included vis; Hæmofiltration & Hæmodiafiltration.
Peritoneal Dialysis (PD) Parameters

If required the following forms of PD could be included:

- CAPD (Continuous Ambulatory PD ie: manual)
- CCPD (Continuous Cycling PD ie: automated)
- IPD (Intermittent PD automated)
- All Dialysis Machines to conform to current ISO standards
- A Kt/V model (PDC) would be used on all patients to determine dialysis adequacy.
- Low Calcium Solution Formulations

9.0 Insurance

The Company shall insure against the following contingencies:

Public and Products Liability:

Personal injury, including bodily injury, death, sickness, disease, shock, fright, mental anguish or mental injury, false arrest, false detention, wrongful imprisonment, malicious prosecution, libel, slander, wrongful entry or wrongful eviction or other invasion of privacy, assault and/or battery committed by any employee of the Company whilst engaged in the Company's business activities.

Property damage, including physical injury to or loss of or destruction of property including loss of use at any time resulting therefrom.

Advertising liability, including libel, slander, infringement of copyright, title or slogan, unfair competition, piracy or idea misappropriation under an implied contract and invasion of privacy committed or alleged to have been committed in any advertisement, public article, broadcast or telecast and arising out of any advertising activities conducted by or on behalf of the Company in the course of advertising the Company's products, goods or services.

Gambro has a local Public/Products Liability Programme which covers claims up to a the local limit of 4,200,000 Swedish Kroner.

Gambro also has a Worldwide Liability Insurance Programme and in case of disputes, disagreements or differences in coverage and/or limits arising out of the local policy, the Worldwide Master Policy will always prevail.

Industrial All Risks Policy:

The Company shall also provide insurance for material damage to the property and contents of the property, including the personal belongings of customers/patients.

Coverage shall include burglary, theft without forcible entry, removal of debris, accidental damage, personal property, money. On buildings, machinery, plant and all other property except finished goods, computer system records, glass and personal property, coverage is for reinstatement, replacement or repair, on finished goods, replacement value, on computer records, etc, the cost of reinstating, replacing, reproducing or restoring same, on glass, the cost of repairing or replacing the broken glass and on personal property, the current replacement cost subject to due allowance for wear and tear.

Workers’ Accident Policy:

The Company shall cover its staff for all accidents occurring at the work-place or as deemed to be at the work place under the statutory Workers’ Accident Policy.
**Dialysis Requirements for Tennant Creek**

Tennant Creek currently has 16 patients relocated to Alice Springs in order to have dialysis treatment. It is envisaged that there will be an average of 5 new patients per year from Tennant Creek, which will be offset to some extent by the high attrition rate due to death and transplantation.

It is the aim of this research proposal to present an attractive scenario to the NT Government. This requires reducing the risk to the health service in terms of unexpected expenditure and the need for contingencies. In addition it is hoped that the local Aboriginal Medical Service - Anyinginyi Congress - will be suitably funded in order for them to manage the service. The employment of local staff as clinicians and support personnel is a priority and access and assistance to appropriate training must be catered for.

**Assumptions**

Clinical control will remain with the Nephrologist from Alice Springs and the Medical Staff of Anyinginyi Congress.

All renovations and refurbishment required to bring the site to suitable standard is the responsibility of the Renal company.

Site remains the property of Congress and is either leased to the renal company or deductions are made from the price per treatment. This should be evident in the calculations.

Contract should be for a period of 5 years with the option to renew.

**The First price should include:**

Renovations to the identified site to include:

- a small waiting area,
- male and female toilets, separate from the dialysis area, if not catered for in the complex
- a staff kitchen,
- a technician room suitable to hold 2 machines and run up one
- a raised nurses station positioned to allow satisfactory viewing of all clients
- 8 dialysis ports on main floor and one in technician room
- Store room sufficient to hold one months stock

**Equipment required:**

- a main RO and filtration system
- 9 dialysis machines one of them to be a double pump machine
- 9 dialysis chairs
- 9 patient trolleys
- 2 TV's positioned from ceiling
- Computer, printer, phones, faxes, fridge
- Emergency trolley
All consumables:

including those associated with dialysis procedure minus pharmaceuticals such as heparin and lignocaine

Catering of one sandwhich and piece of fruit per patient plus tea, coffee and milk

Electricity and water charges

Financial responsibility of timely delivery of stock

Maintenance of internal building and all equipment

Internal and external insurance

Treatments based on minimum of 1248 treatments in the first year. Price should be volume sensitive, as treatment numbers rise, price per treatment decreases.

A second price should include:

Staff ratio based on 2 staff per 8 patients. Aim is to have at least one staff member a Renal trained AHW Level 3 initially, moving to level 4 once satisfactory completion of competencies RN L2 moving to L3 as patient numbers increase.

Included in the price should be an allocation for staff training/conference attendance and patient education particularly in the area of translating material.

For further information please contact Dr Randall Davis 89622385 or

Gillian Gorham 89854991
## Appendix 11.2

### Assessment of Tennant Creek Proposals for Renal Services

<table>
<thead>
<tr>
<th>Services Offered</th>
<th>Baxter</th>
<th>Fresenius</th>
<th>Gambro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract Period (yrs)</td>
<td>5 yrs</td>
<td>5 yrs</td>
<td>5 yrs</td>
</tr>
<tr>
<td>No. of Treatments Yr/Total</td>
<td>1248 yr/41068</td>
<td>2496/12480</td>
<td>2496/12480</td>
</tr>
<tr>
<td>No. of Clients</td>
<td>8 up by 5/yr</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Refurbishment &amp; Fit-out</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dialysis Ports</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Water Treatment Area</td>
<td>Main RO</td>
<td>No specifics</td>
<td>No specifics</td>
</tr>
<tr>
<td>Servicing Area</td>
<td>1 port</td>
<td>Design will meet</td>
<td>Design will meet</td>
</tr>
<tr>
<td>Nurses Station</td>
<td>Yes</td>
<td>requirements for</td>
<td>requirements for</td>
</tr>
<tr>
<td>Office/Tea Room</td>
<td>Yes</td>
<td>a dialysis clinic.</td>
<td>a dialysis clinic.</td>
</tr>
<tr>
<td>Patient Waiting Area</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disabled Toilet and Shower</td>
<td>Yes</td>
<td>$300,000 allowed.</td>
<td>Included in PPT</td>
</tr>
<tr>
<td>Examination Room</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Store Room Capacity</td>
<td>1 mth Stock</td>
<td>Negotiable</td>
<td>No mention</td>
</tr>
<tr>
<td>General Equipment</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes not scales</td>
</tr>
<tr>
<td>computer, photocopier, printer, fax,</td>
<td></td>
<td></td>
<td>office/general</td>
</tr>
<tr>
<td>scales, fridge, TV, office &amp; furniture</td>
<td></td>
<td></td>
<td>furn.</td>
</tr>
<tr>
<td>Dialysis machines</td>
<td>10</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>Consumables for dialysis</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Medications for haemo</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Dialysis Chairs &amp; Trolleys</td>
<td>9 each</td>
<td>9 each</td>
<td>9</td>
</tr>
<tr>
<td>Emergency trolley</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>BP Machines</td>
<td>No mention</td>
<td>Yes</td>
<td>No mention</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Yes, within 24hrs</td>
<td>Yes no time</td>
<td>Yes no time</td>
</tr>
<tr>
<td>Catering</td>
<td>Yes</td>
<td>Not included</td>
<td>Yes</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Yes</td>
<td>Not included</td>
<td>No mention</td>
</tr>
<tr>
<td>Stock Delivery</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Electricity and Water</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Internal/External Insurance</td>
<td>Yes</td>
<td>Internal</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$195</strong></td>
<td><strong>$108</strong></td>
<td><strong>$270</strong></td>
</tr>
</tbody>
</table>

| Nursing Staff                         | 1 RN L2/3          | No staff but offering | Not specific |
| AHW                                   | 1 AHW L3/4         | an ongoing support    |                |
| Staff Ratio                           | 2 to 8             | and training          |                |
| Admin. Officer                        | 1 optional         | package for all staff | No             |
| Translations                          | Yes                | Yes                  | Yes             |
| Training                              | Yes                | Yes                  | Yes             |
| Conference Attendance                 | Yes                | Yes                  | Yes             |
| Education                             | Yes                | Yes                  | Yes             |
| Clinical Control                      | THS and ACAC       | THS and ACAC         | THS and ACAC    |
| Site Lease                            | Not in PPT yet     | Not in PPT           | Factored into PPT|

| **TOTAL with STAFF**                  | **$275**           | **$158** (not ongoing sa) | **$445**        |
Assessment of Tennant Creek Proposals for Renal Services

Baxter: - The price quoted appears extremely attractive. THS is unable to deliver services in the urban area for that cost. Consideration needs to be given to the number of treatments quoted - more than double of the brief which will considerably reduce the PPT. It is unclear if a financial penalty will be imposed if the yearly PPT is not reached but there is a financial incentive to produce more treatments. The number of machines provided varies - will require 10. If the lease payments have not already been deducted than PPT will be less. Baxter believe building and refurbishment costs will be reduced once properly tendered further reducing PPT. Experience with Nguiu and Katherine has demonstrated this to be unlikely with building costs being much higher in the NT.

The concern with this proposal is that the company may not be able to deliver the promised service at this price. The Tender agreement will have to be very specific and tight to ensure all arrangements are met or a financial penalty is imposed. Conversely need to realistically estimate the number of treatments for each year. The 5 year Baxter figure is impossible to meet even if 32 clients started from day 1. Baxter has a long history of service delivery in Peritoneal Dialysis but has only recently moved into the haemodialysis area. They are currently managing a facility in Perth under a similar offer and PPT.

Fresenius: - The company has indicated that they would be reluctant to be contracted to supply renal-trained staff to a remote area. Their proposal includes a fully paid for training package in Adelaide for 6wks with a further two weeks supervision on site. The selection of staff for training and the ongoing salaries after training is the responsibility of the purchaser. This will increase the total price to the purchaser. The exclusion of catering and cleaning is negotiable and would not add more than $10 to the PPT. Fresenius has made a rapid expansion in Australia in the last 5 yrs. They have contracts in all states and their machines are extremely user friendly. It is estimated that salaries based on a 2:8 ratio will cost an extra $70 per treatment.

Gambro: - The price quoted is based on the Brief of a maximum of 16 clients. However Gambro also offered a reduce price per year if treatment numbers rose. The price for 25 clients or 3900 treatments /yr is $378 with staff and $203 without staff. The EOI was unspecific in several areas but would be expected to be considerably clearer if it went to Tender. They have a long history of providing haemodialysis services in Australia and were the first to enter into a PPT arrangement. They have recently provided the machinery for the Pt Hedland Dialysis Unit. The price is not as attractive as Baxter and the tender would need to be very specific to ensure the most is made from the contract.

Our Assessment: - Based on the included Brief we estimated that services could be provided in Tennant Creek for approximately $300 a treatment. A further calculation was made to cover the possibility of having to rotate staff from Alice Springs hospital on a monthly basis increasing the PPT to $350. The attraction of a PPT contract is the ability to reduce additional outlays to support the service such as overheads. In addition the support provided to the clients and staff in terms of education, conference attendance and development of materials including translations is attractive as it eliminates the need for additional proposals for funding.