Greater Metropolitan Clinical Taskforce

Brain Injury Rehabilitation Directorate

Transitional Living Program Evaluation

Stage One Report

March 2006

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NSW HEALTH

Acknowledgments

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APPENDICES

Background to the Project

This report documents Stage One of the GMCT Transitional Living Program Evaluation Project undertaken by Kate Hopman, Project Officer for the GMCT Brain Injury Rehabilitation Directorate

In 2003 the NSW State Government established the Greater Metropolitan Transition Taskforce (GMTT)[1]. The aim of this task force was to provide a mechanism for clinicians and consumers to be more involved in the policy, planning, evaluation and delivery of healthcare services within NSW. To facilitate the efficient involvement of these parties, the GMTT supported the establishment of a number of clinical directorates; one of which was the Brain Injury Rehabilitation Directorate (BIRD).

The GMCT Brain Injury Rehabilitation Directorate (BIRD) was established in 2003. It is made up of an executive consisting of a clinical representative from each specialist brain injury rehabilitation unit within the greater Sydney metropolitan region (including Newcastle and Illawarra). The executive also has two consumer representatives, including one from the Brain Injury Association of NSW, and representatives from paediatric and regional Brain Injury Rehabilitation Programs. The main objective of the GMCT BIRD is to coordinate the provision of effective, efficient and equitable brain injury rehabilitation services throughout NSW.

A distinctive feature of brain injury rehabilitation within NSW is the co-ordinated network of services that provide specialist rehabilitation services within a decentralised structure across the state. This network is known at The NSW Brain Injury Rehabilitation Program (BIRP). This program was established in 1989 as a joint initiative between the NSW Department of Health and the Motor Accidents Authority of NSW. The impetus for this joint venture was the recognition that the needs of individuals with moderate to severe traumatic brain injuries were not being adequately met by the neurorehabilitation system within NSW.

The NSW BIRP comprises 13 individual programs: five of which are located in Sydney (3 adult and 2 paediatric) and eight of which are located in regional centres and provide outreach services to rural areas. Each program offers a different range of rehabilitation services (inpatient, outpatient, transitional living, community based and outreach) according to the needs of their geographical region and client populations.

In November 2003 representatives from the NSW BIRP, the GMTT BIRD and the NSW Department of Health met to determine priorities for the Brain Injury Rehabilitation Directorate. At this meeting, the directorate voted to initiate a project to examine the current Transitional Living Program service models within the NSW BIRP. This project was one of the primary recommendations from the ten (10) year BIRP review completed by Breust and Associates in 2002.

In assuming responsibility for this project the GMCT BIRD directed the following structure to facilitate the project development:
- Recruitment of a project officer (May 2004)
- Formation of a TLP Steering Committee. (June 2004)

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[1] *In 2004 the GMTT was renamed the GMCT – (Greater Metropolitan Clinical Taskforce) to better encompass the clinicians it represented.*

The TLP Steering committee membership included; a representative from each of the adult NSW BIRP services, representatives from the GMCT BIRD (Director and Manager) and the NSW Department of Health (see Appendix 1).

Definition: Transitional Living Program

In order to obtain an objective and concise definition for NSW BIRP transitional living programs, all Steering Committee members were consulted and possible definitions discussed. All members agreed that the primary factor that discriminated between TLP and other post acute rehabilitation programs (community, outreach and outpatient) was the residential nature of the programs and the amount of daily intervention provided. Members identified that it would be extremely unusual for clients who were participating in a community outreach or outpatient program to receive more that 3 hours of direct therapeutic intervention per day, while this was a minimum standard for all TLP participants.

The following definition was therefore adopted for the GMCT project:

A Transitional Living Program is "a short term set of treatments that promote evaluation and development of a client's functional independence, psychological independence and community integration following brain injury. A client who participates in a transitional living program, receives a minimum of three hours of therapy support each day (primarily weekdays), in either a supervised residence or their own home" (modified Sachs, 1986)

Executive Summary

This report documents the findings of Stage One of the GMCT Transitional Living Program (TLP) Evaluation. The GMCT Brain Injury Rehabilitation Directorate initiated this project in May 2004 in response to one of the primary recommendations from the BIRP, ten year, service review (Breust and Associates, 2002). The review recommended that the role, cost and effectiveness of NSW Transitional Living Programs be examined.

Project Methodology
Data for this report was gathered from the following sources:
- Interviews with managers and clinicians at each adult NSW BIRP
- Analysis of a minimum dataset for 2004 from each BIRP TLP
- Literature Review– Medline, CINAHL, Web of Science, Cochrane Collection
- Internet Searches
- Regular Steering Committee meetings to discuss and review data collected
- Informal contact with TLP program managers nationally and internationally

Transitional Living Programs
Transitional living programs (TLPs) have existed within the brain injury rehabilitation continuum since 1978 (Boake, 1990). Within the traumatic brain injury (TBI) literature they are interchangeably referred to as community integration programs, community re-entry programs and/ or residential rehabilitation programs.

Transitional living programs, within the Australian context, provide domestic and community living skills training and assist persons with a TBI to access and utilise community facilities and services (Mid Western BIRP, 1999).

TLPs currently operate in eight of the eleven, adult BIRP services within NSW. Limited documentation exists, which describes these services, the clients who use them, the roles they play within the BIRP continuum or the outcomes they achieve. Information of this sort is required if the BIRP network is to be able to design effective and valid evaluation strategies for these programs.

Literature
TLPs fit under the broad umbrella of post-acute brain injury rehabilitation. They are just one of a number of diverse program models that have developed to support persons with brain injuries and their families to cope with the long term cognitive, behavioural and psychosocial consequences of TBI (Tate et al 2004).

The literature reviewed for this report indicates that there is a growing base of evidence supporting the efficacy of post acute TBI rehabilitation. Limited literature, however, exists which focuses specifically on the efficacy of TLPs. Research studies reviewed for this project included broad service studies like those completed by Cope and colleagues (1991- USA) and by Tate et al (2004- Australia) and smaller program specific studies such as those completed by Willer and colleagues (1999- Canada) and Simpson et al (2004- Australia). These studies demonstrate that clients have attained increased levels of independence, a decreased need for supervision and increased employment rates following participation in a variety of different post acute rehabilitation programs.

Findings from the literature also indicate that BIRP TLPs are significantly different to residential programs described in national and international literature. This diversity can be attributed to a number of factors including; the decentralised nature of the BIRP network, the Australian Healthcare system and differences in Healthcare funding arrangements.

The implications of the findings from the literature review are;
(a) There is limited research, which definitively identifies the key elements of post acute rehabilitation that contribute to successful client outcomes.
(b) A detailed knowledge of BIRP TLP service models is required to be able to identify the commonalities and key differences between individual BIRP TLPs. Without this knowledge it will be impossible to design valid and effective program evaluations.
(c) The BIRP is a unique network of rehabilitation services. Evaluation of this unique network will require an individualised and carefully constructed evaluative framework.

The findings of the literature review shaped the aims of Stage One of this evaluation.

Stage One Aims:

1. Describe the current BIRP TLP service models
2. To identify and describe the clinical population that utilise NSW BIRP TLPs
3. To review and document the current functions of TLPs in NSW
4. To identify potential future evaluation strategies for NSW TLPs.

Evaluation Framework

INPUTS	→	PROCESSES	→	OUTCOMES

This project has adopted a systems model evaluation framework, which analyses input, process and outcomes of programs (Foss Hansen, 2005). Within this framework essential components of BIRP TLPs are described and discussed. A summary of the key findings of each section is provided below:

Inputs:

(1)   Client Characteristics
Comparison of the referral criteria adopted by each BIRP TLP and their minimum data set indicates that there is potentially a baseline of similar characteristics within the NSW BIRP TLP population.

A further more detailed analysis is required to determine whether there are significant differences across programs within key variables such as time post injury, client age and injury severity. These variables are acknowledged to be influential in TBI outcome. A more detailed knowledge of these variables may form the basis for conducting some elements of TLP evaluation across client characteristics rather than by individual centres (e.g. compare everyone admitted to a TLP across the BIRP who were admitted at less then 12 months post-injury, to everyone admitted more than 12 months post-injury)

The review of client characteristics has also identified that a more comprehensive understanding of whether there are psychosocial factors that influence referral to a TLP is warranted. Only when we know these characteristics can we begin to effectively describe the TLP population.

(2)   Service Delivery Models

BIRP TLP models are significantly different to international models and also demonstrate high variability across individual BIRP services. Although highly varied, it was found that there was a reasonable similarity in a number of key components of BIRP TLP operation, including:

- the hours of operation
- the use of weekend leave
- consistency in staffing mix (professional and paraprofessional)
- separation of the service management and clinical program roles
- consistency in staffing ratios (residential staff per client)

These similarities indicate that there may be the potential to develop practise guidelines for NSW BIRP TLP services.

Processes:

(1)   Interventions

Findings from the literature indicate that there is limited consensus about which rehabilitative interventions are efficacious for the post acute population (Phillips et al 2004). Interventions within BIRP TLPs were described and compared to current national and international practice. These comparisons highlighted that BIRP TLPs implement a number intervention principles that are consistently employed worldwide. These include; individualised goal directed rehabilitation, the use of structure to develop consistent routines, activity based therapy, social skills development and the provision of support to facilitate personal and family adjustment.

In comparing intervention practises with those reported overseas it was identified that cognitive rehabilitation appeared to play a less prominent role within NSW BIRP TLPs. Intervention within BIRP TLPs is completed within a framework that is underpinned by cognitive rehabilitation principles (routine, structure etc). Few BIRP TLPs, however, reported completing formalised, individual cognitive therapy sessions with clients. Recent studies are proving that intensive cognitive rehabilitation can improve client outcomes. This may warrant further review within BIRP TLPs.

(2)   TLP functions within the BIRP continuum

BIRP TLPs perform three discrete rehabilitation functions. Two of these functions focus on providing intensive post acute rehabilitation relatively soon after a client's injury. The third function, in comparison, provides rehabilitation to clients who have been residing in the community for an extended period of time.

For this report, the three TLP functions have been termed; Transitional living, Community resettlement and Community management. In general, the most frequently performed function in metropolitan TLPs was Transitional living. In comparison, regional TLPs were equally likely to perform all three TLP functions. These three functions are described in more detail below and will form the framework of an evaluative design for BIRP TLPs.

Transitional Living:

This function involves providing rehabilitation programs for clients who continue to require intensive rehabilitation, to transition from the structured hospital setting to their home. In this process, appropriate clients are admitted to the TLP relatively soon after their injury and generally directly from an inpatient unit. Clients enter the program and work collaboratively with staff to set personal goals. Programs are on

average 4-7 weeks in duration and primarily have a rehabilitation focus on increasing independent living skills, increasing community participation and facilitating adjustment to TBI.

In performing this function, the TLP acts as a discrete step along the BIRP continuum– situated between inpatient and non inpatient programs.

Community Resettlement:
The community resettlement function of BIRP TLPs involves the TLP and non inpatient services working in tandem from the day of the client's arrival. This function is performed for clients requiring or requesting a short admission. Within this type of rehabilitation program, clients spend a short period of time at the TLP (1-2 weeks), where they meet BIRP team members and complete initial assessments. After completing these assessments clients are encouraged to set personal goals and an outpatient and home based intervention program is developed. The home based program is an alternative to a continued residential program and is usually more acceptable to clients who have already spent a long time in metropolitan inpatient units. The home based program is usually less intensive than the residential based TLP. Clients supported within this function may also be referred to other community services for ongoing rehabilitation therapy and support.

Community Management: The third function that BIRP TLPs perform is that of Community Management. This rehabilitation function is utilised for clients who are greater than 1 year post injury (sometimes many years post injury) and who have commonly spent time living in the community prior to their admission. For these clients an event or decision has often precipitated the need for change in their current living arrangements eg a young adult wanting to move out of the family home.

Clients who are admitted for community management often arrive with pre-determined goals (established in consultation with the community/ outreach team). The TLP may be utilised for completing living skills assessments, or as an environment for assessment and intensive living skills training. Programs can range in length from a couple of weeks to months.

Outcomes:

(1) Current Practise in BIRP TLPs
Rehabilitation outcomes can include both service outcomes and individual clinical outcomes. To date evaluation of both of these has occurred at an individual program level within each BIRP TLP but has not occurred across programs at a state level. Analysis at the state level would facilitate a more detailed examination of the efficacy of BIRP TLP services and the development of TLP service benchmarks.

Congregate data analysis across BIRP TLPs has been inhibited in the past by the differing types of TLP service models supported by the BIRP, the small client populations and the limited knowledge of key client variables which could restrict or promote data pooling.

This report has identified that congregate analysis could potentially occur across both service and clinical outcome data collected at BIRP TLPs. At this time, the collection of global standardised outcome measures (clinical outcomes) is recommended as it appears to be the most efficient and readily accessible method for facilitating data pooling.

Conclusion

Prior to this report, there was very limited literature which described NSW BIRP TLP service delivery models. There was also a lack of knowledge about the characteristics of clients who utilised BIRP TLP services and the interventions they received. Information of this sort is a necessary precursor to effective program evaluation and thus formed the basis of Stage One of this TLP evaluation.

Stage One of this project has involved utilising an Input, Process and Outcome systems framework, to develop detailed descriptions of TLP services as they exist within the NSW BIRP in 2005. It has provided preliminary data on the characteristics of BIRP TLP clients and has highlighted that BIRP TLPs perform three discrete rehabilitation functions within the BIRP continuum. These functions include; Transitional living, Community resettlement and Community management.

Use of a systems framework has also highlighted that BIRP TLP service models are significantly different to national and international residential models and are high variable across individual programs within the BIRP network. Despite this variability, a range of core commonalities have been identified that could potentially be utilised to develop service benchmarks. Benchmarking would work towards insuring that BIRP TLPs operate within a framework of best practise and follows recommendations from the recently completed BIOS report which advocates that the BIRP network be used as its own benchmark for TBI rehabilitation (Tate et al 2004).

NSW BIRP TLPs are small programs which have a limited ability to demonstrate efficacy using individual program data. Congregation or pooling of TLP outcome data across the network is therefore recommended to examine the possible benefits and cost effectiveness of these programs. These findings are in alignment with those of Malec and Basford, who, in their systematic review of post acute rehabilitation, state: "Multi centre studies are necessary to acquire adequate data to support estimates of benefits and cost effectiveness" (Malec & Basford, 1997).

To explore possible data pooling strategies across NSW BIRP TLP services, Stage Two of the TLP evaluation has been initiated. This has involved the development and implementation of a pilot outcomes project. The project commenced in January 2005 and is due for completion in March 2006.

The TLP pilot outcomes project has three primary aims:
- To trial two standardised outcome measures (selected by TLP managers and clinicians) and assess their utility in measuring functional change over the duration of a TLP
- To collect detailed client data to establish whether individual BIRP TLPs service similar populations. This must be established before valid methods of data pooling can be developed
- To analyse current TLP referrals to assess whether all referred clients can be classified within the three BIRP TLP function streams; Transitional living, community resettlement or community management.

Data from this project will be analysed and documented within the Stage Two TLP Evaluation project report, which is due for completion in May 2006. It is envisaged that the results of the pilot project will contribute to the development of an evaluative framework which will facilitate routine collection, measurement and analysis of TLP clinical outcome data.

Chapter 1: Introduction

This report documents the findings of Stage One of the GMCT Transitional Living Program (TLP) Evaluation. Stage One of this project has consisted of; reviewing the current literature in the area; developing comprehensive descriptions of each TLP service within the NSW BIRP and initiating a pilot project to facilitate outcome measurement across services.

This chapter provides:
(i) A brief description of the NSW Brain Injury Rehabilitation Program (BIRP)
(ii) An overview of the relevant literature pertaining to TLPs and to post-acute rehabilitation programs more generally
(iii) An outline of the evaluation framework that has been adopted in this project.

1.1 The NSW Brain Injury Rehabilitation Program

The NSW Brain Injury Rehabilitation Program (BIRP)
is a statewide network of specialist rehabilitation services for people who have sustained a traumatic brain injury (TBI). The network comprises 13 individual programs: five located in Sydney (3 adult and 2 paediatric) and eight located in regional centres (servicing both adult and paediatric clients). Those programs located in regional centres also provide outreach services to rural areas of NSW. Each program is government funded and services a defined geographical catchment.

The BIRP network was established in 1989 with a strong commitment to longer term, community based rehabilitation and for providing specialist rehabilitation close to a person's local community (Mid Western Brain Injury Rehabilitation Program, 1999). Individual BIRP services provide community rehabilitation through a variety of post acute rehabilitation programs. These include; transitional living programs (TLPs), outpatient programs, home and community based programs and case management. Within each BIRP, a variety of post acute programs are utilised to form a comprehensive continuum of rehabilitation. Each program within the continuum plays a unique role as determined by the needs of each individual BIRP. Clients of BIRP services are likely to participate in a combination of different post acute rehabilitation programs as they undergo the complex process of resettlement within their local community.

TLPs currently operate in eight of the eleven adult BIRP services within NSW (a brief history of the development of these programs is located in Appendix 2). Limited documentation exists which describes these services, the clients who use them, the roles they play within the BIRP continuum or the outcomes they achieve. Information of this sort is required if the BIRP network is to be able to design effective and valid evaluation strategies for these programs.

1.2 Literature review - Post Acute Rehabilitation

BIRP TLPs fit under the broad umbrella category of post-acute brain injury rehabilitation. A literature review focussing on post acute TBI rehabilitation was completed for this project (see Appendix 3 for Methodology). The aim of this review was to identify current evidence supporting the efficacy of post acute rehabilitation for persons with TBI and in particular the efficacy of TLPs.

Since the early eighties there has been a growing awareness that "recovery", from brain injury is a long and arduous process that extends well beyond a persons initial inpatient admission (Boake, 1990; Willer & Corrigan, 1994; Tate et al 2004). Authors world wide have identified that people who sustain brain injuries require prolonged rehabilitation (Cope et al, 2005; Davies et al, 2000; Venzie et al, 1996) which focuses on supporting them and their families to cope with the long term cognitive, behavioural and psychosocial consequences of TBI. Post acute rehabilitation programs have thus evolved to address this extended rehabilitation need.

The goals of post acute TBI rehabilitation have been described as being typically focussed on:
- Fostering participants' awareness of their functional potential
- Improving personal organisation and social skills
- Developing compensatory strategies for residual cognitive limitations
- Developing psychologic coping skills for emotional and behavioural management
- Participating in social, work and leisure activities and
- Adapting to facilitate social role functioning (Cicerone et al 2004).

In the last two decades a number of different international post acute program models have been described within the literature (see Malec & Basford, 1996; NIH TBI Consensus Conference, 1999), these include:
- Neuro-behavioural programs
- Residential rehabilitation programs (also referred to as transitional living or community re-entry programs)
- Comprehensive day treatment programs
- Outpatient programs
- Home and community based programs
- Outreach programs and
- Vocational rehabilitation programs

The programs identified above, vary with respect to a number of key components which include; the frequency, intensity and types of intervention they provide, the settings in which intervention is offered, the staff which are employed and the clients who receive services (Glen et al 2004). Such variability has made effective comparison and evaluation of these program models extremely difficult.

Anecdotal evidence (discussions with Rehabilitation Specialists both within Australia and Overseas) appears to indicate that there has been a recent growth in the number of rehabilitation services that have elected to offer services through an intensive day program (as opposed to a residential program) model. At this point there is no clear evidence documenting this trend or describing why this has occurred. It is likely, however that there is financial incentive to offer services in this way as they are less costly.

In contrast to the above anecdotal evidence, figures published by the Commission for Accreditation of Rehabilitation Facilities (USA) seem to identify that residential rehabilitation is still the most frequent model of post acute rehabilitation utilised within the USA. This organisation reported that; 153 outpatient programs, 51 home/ community programs, 231 residential programs and 86 vocational programs had been accredited by the Commission in August 2004 (Cope and Meyer, 2004).

Efficacy of Post Acute Rehabilitation

Findings of TBI specific, systematic literature reviews and research studies were reviewed for this evaluation. In general, the studies reviewed provided support for the efficacy of post acute rehabilitation and highlighted positive outcomes such as increased independence, increased rates of return to work and a decreased need for supervision for individuals with TBI, following their participation in post acute rehabilitation programs.

Two systematic literature reviews and three research studies are described and briefly discussed below. These studies reflect brain injury rehabilitation trends and/ or the Australian rehabilitation context. Further references to specific literature are also made throughout the body of the report as they relate to relevant aspects of TLP service delivery and interventions.

Systematic Reviews

(1)   Malec and Basford (1996, USA).

This paper reviewed outcome data from published post acute, programmatic studies reported through to 1994. Authors of this review reported that evidence, in general, was supportive of the overall efficacy of post acute rehabilitation programs. In particular authors highlighted that a number of studies had demonstrated that clients had attained increased levels of independence, a decreased need for supervision and increased employment rates following participation in post acute rehabilitation. The authors of this review recommended that further studies be completed with the aim of clearly describing the rehabilitation procedures and populations in specific post acute programs. They proposed that such studies would assist in determining which components of programs were influential in successful client outcomes.

(2)   The National Institute of Health (1999, USA).

This review evaluated 2563 articles on all aspects of TBI rehabilitation. Authors acknowledged a "paucity of rigorous investigation" amongst studies, clarifying that there were a lack of studies which utilised control or comparative group methodologies. The panel did however confirm Malec and Basford's (1996) findings; stating that, in general, there was evidence to support the efficacy of post acute rehabilitation. They also identified that there was growing evidence specifically supporting the use of cognitive and behavioural strategies for persons with TBI. The NIH review highlighted key intervention principles for post acute programs. These included; structure; goal directed; individualised; involving learning and practise, involving social contact; and occurring within meaningful contexts.

Research Studies

(1)   Powell J, Heslin J & Greenwood R (2002, UK).

This study compared outcomes from two different types of post acute rehabilitation programs (N=92). The first program provided multidisciplinary community outreach therapy, while the second provided an education program based on written information about TBI. The study found that outreach clients demonstrated significantly more functional gains compared to clients who received the education sessions. No differences were noted however in the frequency of socialising, depression or employment levels between the two groups.

(2)   Cicerone K, Mott T, Azaluy J & Freil J (2004, USA).

This study compared outcomes attained by clients participating in a standard TBI outpatient program to those achieved by clients participating in a cognitive focussed

outpatient program (N=56). The study found that both groups made significant gain in community integration, with the "cognitive group" making significantly greater improvement that the standard program.

(3)   Tate R, Cameron I, Winstanley J, Myles B & Harris R (2004, Australia).
The Brain Injury Outcomes Study (BIOS) was completed within the NSW BIRP in 2004. This study was a multi-centre study investigating outcomes after TBI for clients of the BIRP network. In this study a cohort of 198 clients, who had sustained a TBI, was followed prospectively over a three year period. This study found that the majority of clients demonstrated significant improvements in overall level of functioning and decreases in disability and impairments over the course of their rehabilitation. The BIOS study also identified that clients who had a PTA length of greater than 4 weeks had poorer outcomes and displayed significantly lower levels of community participation compared to the other client groups.

The BIOS study acknowledged that the NSW BIRP is a unique network of TBI rehabilitation services that is markedly different to other national and international program networks. It proposed that the unique nature of the BIRP warranted further evaluation which involved using the BIRP as its own benchmark against which provision of rehabilitation services could be measured (Tate et al 2004).

The implications of this finding for the BIRP TLP evaluation, is that any evaluation framework developed is likely to need to follow in the same vein. Whereby programs within the BIRP are used as the standard against which outcomes should be measured and compared.

Summary
The systematic reviews and research studies described above suggest there is a growing base of international and Australian evidence which supports the efficacy of post acute rehabilitation. They also highlight the need for further research which provides greater program description and program comparisons. This type of research is required to facilitate a greater understanding of the key components of post acute rehabilitation programs and to assist us to develop strategies to identify those components that influence positive client outcomes.

1.3   Literature review - Transitional Living Programs

Transitional living programs (TLPs) have existed within international brain injury rehabilitation continuums since 1978 (Boake, 1990). In the international literature they are interchangeably referred to as community integration programs, community re-entry programs and/ or residential rehabilitation programs. However across Australia TLP or Transitional Living Unit (TLU) are the commonly used terms.

Transitional living programs, within the Australian context, provide domestic and community living skills training and assist persons with a TBI to access and utilise community facilities and services (Mid Western BIRP, 1999).The literature reviewed for this project highlighted that TLP programs within the NSW BIRP are significantly different to TLPs described both nationally and internationally and that individual service models are highly variable across the BIRP network.

This project located a total of 14 TBI rehabilitation outcome studies that measured outcomes from transitional living/ residential rehabilitation programs. Some of these outcome studies were for individual programs while others reported clinical outcomes across a range of post acute services, of which the TLP was just one component. A summary of these programs and outcomes is provided in Appendix 4.

The tendency of research studies to report global outcomes across a range of post acute rehabilitation programs highlights one of the key difficulties or challenges for TLP evaluation. This is the challenge of trying to identify the unique contribution of the TLP to the post acute rehabilitation continuum. In 1986, Sachs identified transitional living programs as "one of the most vaguely defined and most problematic to evaluate" in the area of brain injury treatments (p6). He proposed that programs needed to be clearly differentiated from other types of post-acute rehabilitation before adequate evaluation of these programs could occur.

Three TLP outcome studies have been described below. These studies were selected due their high level of methodological rigour, relevance to service evaluation and/or understanding of the Australian context.

(i) Willer B, Button J & Rempel R (1999, Canada).
In this study the outcomes of two matched intervention groups were compared. The first group (n=23) participated in a residential rehabilitation (length unspecified), while the second group (n=23) received a variety of outpatient services dependent on their individual needs. The second group were described as receiving a highly variable range of services with 8 clients receiving "virtually no services" while 15 received a mix of physiotherapy, psychologic services, occupational therapy, case management and home maker services.

Willer's study used a modified version of the HALS (Health Activity Limitations Survey) scale and the CIQ (Community Integration Measure) to measure outcomes. The authors found that those clients who participated in the residential program demonstrated significantly greater improvement on cognitive and functional tasks. Both groups, however, demonstrated a similar level of social integration at the end of their respective programs.

(ii) Hayden M, Rotman R, Goldstein E & Selleck E (2000, USA).
The study by Hayden and colleagues described a residential rehabilitation program with an intervention focus of modifying the environment. In this program clients received five to six hours of intervention a day in environments of gradually increasing levels of stimulation and complexity. This study revealed that there were three distinct populations serviced within the program; acute clients (who were transferred from inpatient facilities), clients admitted from the community but who were less than 1 year post injury, and clients who were admitted more than a year post injury.

Hayden's study identified that each discrete client group made different gains in independence from admission to discharge and had a different average program length of stay. They proposed that program evaluation would be more valid if each of these populations were considered separately. This study did not however employ a control group to facilitate further analysis of program efficacy.

(iii) Simpson G, Secheny T, Lane-Brown A, Strettles B, Ferry K & Phillips J (2004, Australia)
This is the first published study to describe and document outcomes from a NSW BIRP TLP. Findings from this study demonstrated that the majority of residents at the Liverpool TLU made gains over the duration of their program. The authors also identified that the program length for clients was relatively short compared to national and international programs, with a mean of just seven weeks.

This study supported Hayden's (2002) findings, which concluded that there were specific sub populations of clients serviced within TLPs. The populations identified in this study were an "early" and a "late" population. The early, being those who entered the program within 9 months of injury and the late being those who entered the program greater than 9 months post injury. This study demonstrated that significant gains in participation and activity levels were made by both populations, with the early group making significantly greater gains than the later group. The greater difference may reflect, in part, the process of natural recovery in the early stages post injury.

The 15 outcome studies reviewed for this section of the report represent a limited body of literature examining the efficacy of TLP rehabilitation. They draw attention to considerable differences amongst TLPs worldwide and demonstrate a need to understand the nature of the individual health care systems and countries within which each program operates.

Apart from the three studies described above, methodological issues and scant program descriptions have resulted in only a small body of literature on TLP efficacy. The review has highlighted that detailed program descriptions are required if we are to identify the key components of TLPs and responsibly evaluate these programs.

1.4   Program Evaluation

Evaluation is a process that assists us to determine;
- what a program has done;
- whether a program has met its objectives
- whether the processes within the program have worked well;
- those processes that didn't work so well and
- how to improve practice

Figure 1a: TLP Evaluation Framework
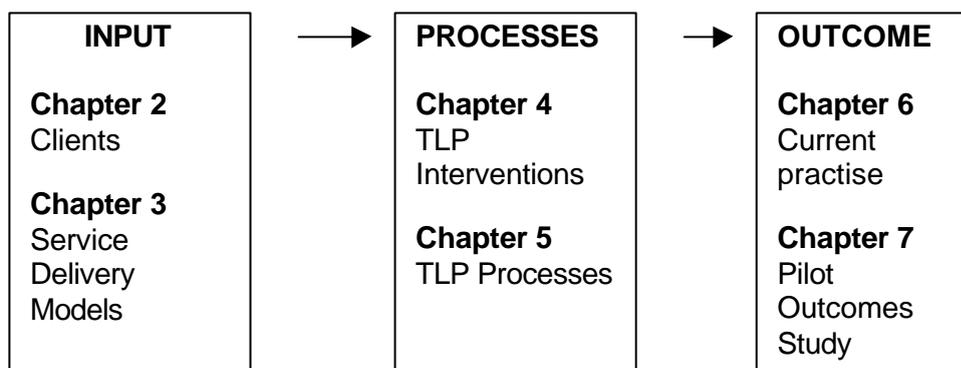
INPUT		PROCESSES		OUTCOME
Chapter 2 Clients **Chapter 3** Service Delivery Models	→	**Chapter 4** TLP Interventions **Chapter 5** TLP Processes	→	**Chapter 6** Current practise **Chapter 7** Pilot Outcomes Study

This project has adopted a systems model evaluation framework, which analyses input, process and outcomes of programs (Foss Hansen, 2005). Figure 1a locates the different BIRP TLP components as they are discussed within this framework. A brief overview of each chapter is provided below:

Program inputs
These are described in chapters 2 and 3 and include:
- TLP client characteristics- descriptions of the characteristics of clients utilising BIRP TLP services (demographics, injury severity etc).
- TLP service delivery models- description of a broad range of TLP service characteristics such as staffing, hours of operation, costs etc.

Program processes
These are described in chapters 4 and 5 and include:
- TLP interventions- descriptions of the intervention mix and intensity within BIRP TLPs. This chapter also discusses these interventions with relation to current evidence based practice.
- TLP process- outlines the different functions of TLP within their individual BIRP continuum. It concludes with some directions for possible evaluation of these processes.

Program outcomes:
These are described in chapter 6 and 7 and include:
- An overview of different outcome measurement strategies
- A discussion of the challenges to program evaluation posed by the unique nature of the BIRP
- Current outcome measurement practises within BIRP TLPs
- Chapter 7 concludes the report with a description of the TLP outcomes project, which has been initiated to address some of the evaluation issues identified within this report

1.5   Key Findings

1.   Limited literature
Although there is some evidence which indicates the benefits of TLPs, this evidence is limited. There is a need for more rigorous research in this area as well as the broader area of post acute TBI rehabilitation. Implications for the NSW BIRP, is that the design of TLP evaluation has few established evaluation frameworks to draw on. Much of the BIRP TLP evaluation strategy, therefore, will have to be generated from the findings of the project itself and be guided by current research practise.

2.   Limited knowledge of NSW BIRP TLP services
A common theme that has emerged both in the broader post-acute systematic reviews, as well as the smaller pool of TLP studies, is that of the challenge of evaluating heterogenous programs. This challenge has been exacerbated by inadequate individual program descriptions and highlights the importance and need to develop comprehensive descriptions of NSW BIRP TLP services. These descriptions will work to identify the commonalities between programs, as well as the critical differences. This information is required for the development of valid evaluation approaches for the BIRP TLP network.

3.   The unique nature of the NSW BIRP Network
As highlighted in the BIOS study (Tate et al 2004), the NSW BIRP is a unique TBI service provision network. Like the BIRP network as a whole, BIRP TLPs are also unique when compared to national and international programs. This means that evaluation of these programs will need to occur internally within the BIRP rather than from external comparison with national and international program models.

4.   TLP client sub-groups
The studies by Hayden et al. (2000) and Simpson et al. (2004) have highlighted the existence of various client subgroups within TLPs. These sub groups have differing profiles and outcomes. It is important to determine whether these sub groups are similar or different across the NSW TLPs.

Chapter 2: Inputs

TLP Clients

The TBI population is widely acknowledged to be heterogenous, within which clients differ markedly in their injury severity and impairment levels. This variability results in a population which has a wide range of different functional impairments and rehabilitation needs.

The literature highlights that effective TBI program evaluation can only be designed when there is a clear description of the client population receiving services.

To describe the NSW BIRP TLP population the following tasks were undertaken:
(i) Referral criteria for the BIRP TLPs were compared
(ii) Preliminary data from the BIRP Minimum Data Set (MDS- 2004) was reviewed
(iii) Specific client characteristics were described and
(iv) Issues pertinent to evaluation design were discussed.

2.1 Referral Criteria

Each TLP within the NSW BIRP, except Ryde, has a documented set of referral criteria (see individual program descriptions- appendix 5 for complete listings). Review of these criteria identified that they are consistent across the BIRP network and include;

- Diagnosis of traumatic brain injury: All programs acknowledged they would also accept referrals of adults with acquired brain injury if a vacancy existed.
- Medically stable
- Adults of working age
- Physically independent: clients must be independent or require minimal physical assistance for transfers, mobility and self care tasks.
- Motivated to participate: clients are required to display motivation to participate in the transitional living program
- Manageable behaviour: clients must be able to be safely managed by a single staff member
- Access to weekend accommodation: Hunter and Westmead programs document that referred clients must have accommodation for weekends and a clear discharge destination plan prior to being accepted to their TLP. All other programs verbally acknowledged that a plan for weekend accommodation was discussed with clients prior to their admission.

In contrast Ryde has no documented admission criteria and provides services to a broader TBI population. Admissions to the Ryde program are highly dependent upon the needs of their inpatient service.

The consistency of each program's referral criteria (excepting Ryde) indicates that the clients that access BIRP TLPs have a base of potentially similar characteristics.

2.2 Population Characteristics

To increase our understanding of the size and characteristics of the BIRP TLP population, an analysis of the BIRP TLP minimum data set (MDS) from January - December 2004 was conducted. This data was submitted from seven of the eight TLPs within the NSW BIRP as part of a network minimum dataset (MDS). The data needs to be viewed cautiously as individual programs have acknowledged inaccuracies within this data set.

MDS data identified that a total of 109 new clients participated in TLPs across NSW in 2004. This figure represents approximately 20 % of all the new post acute rehabilitation admissions within the BIRP for 2004 (total admissions = 504). The distribution of these admissions across individual TLPs is displayed in Figure 2a below.

Figure 2a: Frequency of TLP admissions per program
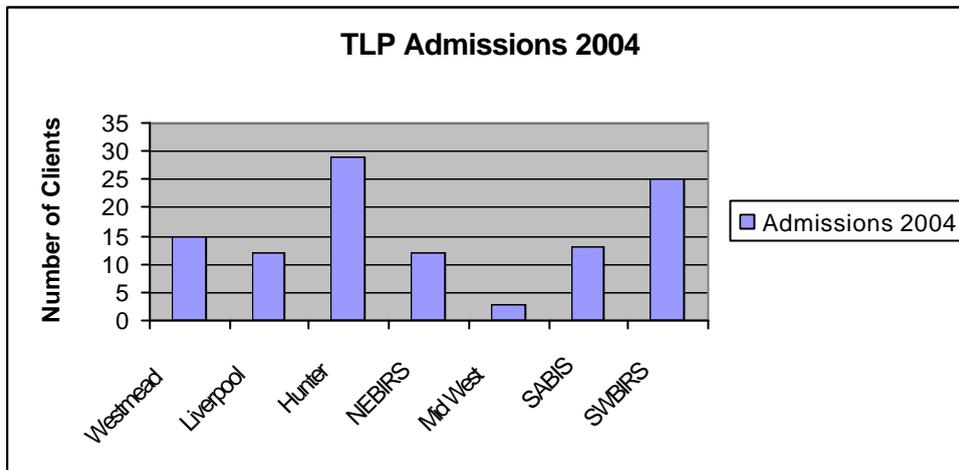
Review of the MDS has highlighted that Admissions to BIRP TLPs fluctuated quite markedly over the two six-month periods. These figures therefore represent only a snapshot of TLP admissions. Further data collection is required to establish whether there is an average annual level of TLP admission rates across the BIRP.

2.3   Client Profile

The current MDS collects client information on age, sex and injury severity (as measured by length of PTA and GCS scores) for all clients admitted to BIRP TLPs. This data was analysed for the 109 admissions captured by the MDS in 2004.

(i) **Sex**
Clients admitted to the TLP had a sex ratio of male to female at 3:1 which is reflective of the current ratio of TBI occurrence across Australia. There has been some suggestion in the international literature that outcomes from TBI rehabilitation do vary in association with sex. A valid TLP evaluation strategy must therefore include analysis of the sex related differences in admission patterns across each BIRP TLP.

(ii) **Age**
Figure 2b demonstrates that TLP admissions represent a range of client age groups with no specific age grouping showing a significant majority. There appears to be fewer clients, however, who are in the youngest and oldest age group categories.

This age pattern may suggest that BIRP TLPs are not viewed as a suitable intervention for paediatric/ adolescent clients or elderly clients. The smaller numbers of clients in the older age category may be a reflection of the "working" age criteria adopted by a number of TLPs.

There has been some suggestion in the international literature that outcomes from TBI rehabilitation do vary in association with age. It will therefore be important to further analyse the TLP MDS to determine whether or not there are significant age-related differences in admission patterns across NSW BIRP TLPs.

Figure 2b: Age of client at admission to the TLP
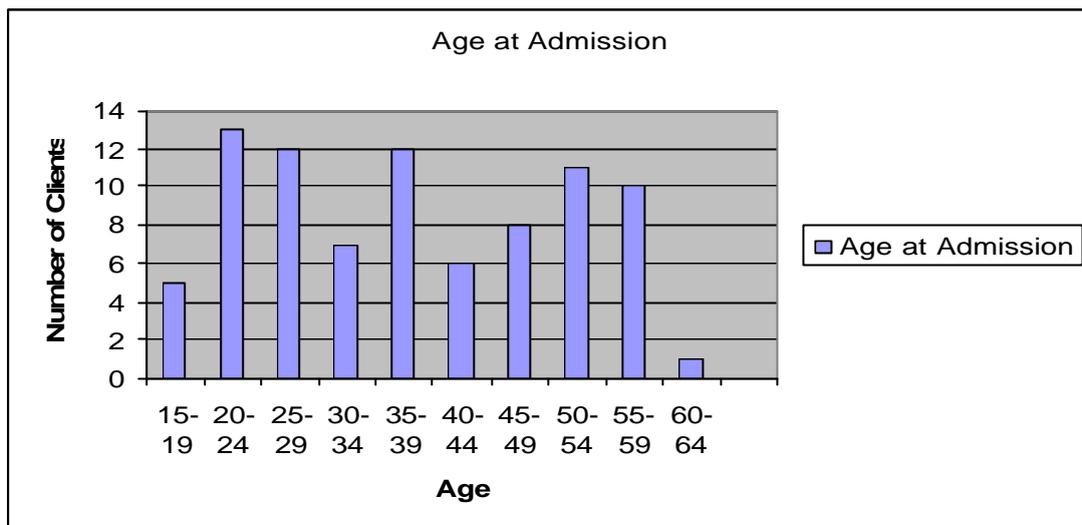
(iii) **Injury Severity**
TLP clients within NSW ranged from having a mild through to an extremely severe injury and also included clients with a diagnosis of non TBI (ie clients with a diagnosis of acquired brain injury; including hypoxia, aneurysms, tumour etc). Post traumatic amnesia (PTA) duration was utilised as the determinant for injury severity within the MDS reporting system.

Figure 2c: Injury Severity for Clients Admitted to BIRP TLPs in 2004
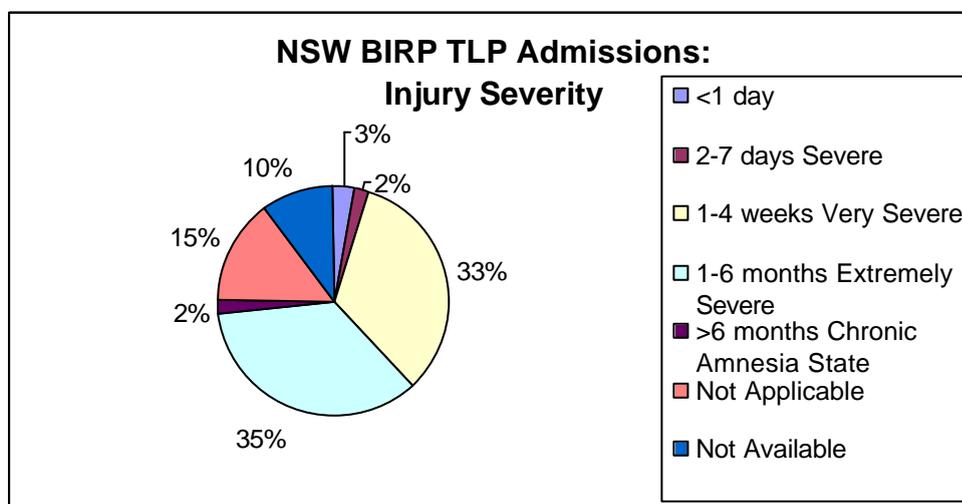
The above figure illustrates the percentage of TLP admissions across the BIRP in relation to injury severity. They highlight that the majority of TLP clients are those that have very severe to extremely severe injuries. They also highlight that there is a significant proportion of TLP admissions of clients with non-TBI.

Preliminary comparative analysis of injury severity across programs was conducted by comparing "metropolitan" to "regional" TLP admissions. Current data indicates that there is no significant difference between these two program groupings (comparative analysis between individual programs was not possible due to the small numbers of

clients). This finding, however, needs to be viewed with caution as there were a large proportion of clients in "regional" units who did not have a PTA score documented. A more detailed analysis needs to be conducted to examine whether there are significant differences in TLP admission profiles in terms of (a) type of injury (TBI versus other ABI), and (b) the level of injury severity among individual BIRP TLPs.

(iv) **Time Post Injury**

A number of authors have documented that clients completing post acute rehabilitation programs appear to fall within discrete categories based on their time since injury. Evans (1997) describes these categories as recently discharged and chronic clients while Simpson and colleagues (2004) describes them as an early and late rehabilitation group.

Simpson et al's (2004) study of clients at the Liverpool TLP identified that significant improvements in functional status and activity participation were made by both rehabilitation groups. It was, however, observed that the early group made significantly greater gains than the late group. This finding indicates that time post injury is a factor that can influence the level of client outcome from a TLP admission.

An analysis needs to be conducted to examine whether there are significant differences in TLP admission profiles in terms of the time post-injury that clients are admitted. This information was not consistently collected as part of the TLP MDS.

2.4 Other TLP client characteristics

(i) **Psychosocial factors**

The current MDS, as the name suggests, collects a minimum number of client injury and demographic details and thus provides only a limited ability to describe the TLP client group. Items such as financial resources, family support and previous life experiences have been nominated as factors which influence the type of post acute rehabilitation programs that clients may utilise (Forster et al, 1999). A more detailed analysis of these factors would assist further refinement of the characteristics of TLP clients within the NSW BIRP.

(ii) **Are all clients with TBI candidates for a TLP program?**

One of the broader TLP evaluation questions that arises is whether there is a particular profile (or subset) of clients likely to be admitted to a TLP. Lentz and Grove (2002) developed a list of residential rehabilitation client characteristics based on their service's experience in the USA. These characteristics included;

- Those who demonstrated an inability to self structure their time
- Those who required 24 hour supervision
- Those who had attempted to resume their previous lifestyle but had failed
- Those who are unable to access specialised brain injury services in their local area
- Those who have minimal or no family support
- Those with a previous history of drug and alcohol abuse
- Those clients who displayed maladaptive behaviours (moderate)
- Those who had history of psychiatric disturbance

Further research in this area would be required if we are to identify and compare the TLP client profile to the broader BIRP service caseloads. This is an important issue, because it may highlight that TLPs play an important role with some sub-groups of people with ABI who may not immediately benefit from an alternate community-based rehabilitation program.

2.5   Key Findings

1.   TLP Population

Seven of the eight NSW BIRP TLPs share common referral criteria. It is therefore likely that there will be some baseline similarities of people admitted to these programs. Prior to conducting comparative program evaluations it will be important to examine whether there are significant differences between programs in the following client characteristics;
- Sex
- Age,
- Length of stay,
- Injury severity and
- Time post-injury.

Completion of this further analysis may also form the basis for conducting some elements of TLP evaluation across client characteristics rather than across programs (e.g. compare everyone admitted to a TLP across the BIRP who were admitted at less then 12 months post-injury, to everyone admitted more than 12 months post-injury).

2.   Psychosocial Factors

It would be beneficial for NSW TLPs to gather more detailed information about referred clients' psychosocial situations. An evaluation strategy could then potentially include an analysis of the impact of psychosocial factors on determining TLP admissions and on clinical outcomes.

Chapter 3: Inputs

TLP Service Delivery Components

International studies have highlighted that post acute service delivery models vary not only across program types but within specific programs such as transitional living. A recent study by Glen and associates (2005) reviewed 30 residential rehabilitation programs in the USA and found great diversity in key program components such as staffing levels, physical settings, interventions and length of stay. They stated that these factors all influence clinical outcomes and therefore need to be categorised prior to determining whether programs have enough similarities to facilitate valid comparisons.

This chapter documents the key components of NSW BIRP TLP models and describes commonalities and differences across a number of attributes including:
(i) Settings
(ii) Hours of operation
(iii) Weekend closure
(iv) Staff profiles
(v) Paraprofessional/residential staff,
(vii) Professional staff
(viii) Program costs for the financial year 2003/2004.

Comprehensive descriptions of each individual BIRP TLP service delivery model have also been developed for this project (See Appendix 5)

3.1 Settings

BIRP TLPs are generally implemented within designated residences known as transitional living units (TLUs). These units are located in different settings within individual BIRP services including:

- attached to a rehabilitation ward
- a separate residence located on hospital grounds
- private residences within the community
- a client's own home – available only at the Mid Western BIRP and limited to clients who reside within an hour of the Mid West staff offices.

In terms of a preferred or ideal setting, the home environment and community based settings have been claimed by many authors to be the most clinically effective sites in which to provide post acute rehabilitation (Sachs, 1986; Giles and Sore 1988; Ponsford, 1995; Pace et al. 1999; Willer et al 1999). These sites have been promoted because they provide meaningful and relevant contexts for clients and can promote skill generalisation through environmental familiarity. However, to date no studies have identified whether program setting is a significant variable in improving clinical outcomes.

3.2 Hours of Operation

The majority of NSW BIRP TLPs provide 24 hour staffing, generally from Monday to Friday. Each program is however, unique in its specific hours of operation (refer to individual program descriptions- Appendix 5).

Of the eight BIRP TLPs, two do not automatically provide 24 hour residential staffing at all times. The first - "Kameruka" (at Tamworth Base Hospital) provides residential

care staffing from 7:00am to 10:30pm (Monday-Friday). This program is co-located with another health program and has an agreement that night staff from the co-located program will provide night supervision and monitoring of BIRP TLP clients

The rationale identified for this staffing model was:
- Historically, TLP clients had rarely needed support at night
- The Kameruka program is implemented on an intermittent basis and thus was economically inefficient if required to employ permanent, full time night staff

The second program -The Mid Western Brain Injury Rehabilitation Program utilises a casual staffing model. The rational for this was:
- Program offers both home based and residential based TLPs
- The need for programs fluctuates
- Program aim to have the flexibility to roster staff support to match individual client needs
- Clients may begin with a TLP that is staffed 24 hours a day from Monday to Friday and then progress to reduced support levels as their independent living skills increase

Night Staffing: Access to night staffing, for TLPs, is an essential service delivery component. Currently there are is range of staffing models utilised within the BIRP to address this need. These include; casual models, permanent night staff, co-location with other services and a roster of on call staff in combination with personal alarm systems.

The Epworth model of service delivery in Victoria has adopted a "sleepover" night shift for their program as they identified that clients within their service rarely needed support at night. This model has provided a cost effective method to providing night supervision (and support if required). This model is not currently an option within NSW as there is no provision for a sleepover shift within the NSW Health Employment Awards.

3.3   Weekend Closure

NSW BIRP TLPs close for a minimum of one day and night over the weekend period, (excepting Ryde). The majority of programs close from Friday afternoon to Monday morning with the expectation that clients will return to their home and family on the weekend.

Weekend closures were not an original feature of BIRP TLPs. At their inception, all programs operated continuously, seven days a week. Over time NSW TLPs began to initiate weekend closures on a regular basis.

To explore this change in practice, discussions were held with managers at each TLP. A list of influencing factors was identified and these are documented below:
- Enhancing skill generalisation – Staff at some programs saw the weekend as an important time for clients to trial strategies they had learnt at the TLP, in their home environment
- Facilitating Family Adjustment – Program staff reported that weekend leave provided opportunities for families to experience or "practise" supporting their relative. Discussions with family members following a weekend leave period was felt to facilitate further education and adjustment within families
- Budgetary constraints – Some services identified that their budget allocation was not sufficient to continue supporting weekend TLP staffing

- Therapy constraints – No programs employed allied health staff on weekends

The list above indicates that decisions to close TLPs over the weekend were based on both clinical and economic factors.

Weekend closure is a unique feature of the NSW BIRP TLPs. All national and international programs reviewed by this author were documented as being "open" twenty four (24) hours a day, seven (7) days a week.

One consequence of this approach has been the necessity to develop flexible ways to provide accommodation for those clients who can not return home on weekends (geographical distance prohibitive in rural areas). Strategies developed by some programs include; families staying with the client at the TLU on the weekend; the client being accommodated within an inpatient rehabilitation unit over the weekend, the use of respite service support and as a last resort opening the TLU for the full seven days.

3.4   Staffing

NSW BIRP TLPs are staffed with a component of residential staff and allied health professionals. New Haven at Ryde is the exception to the above staffing model, utilising allied health staff and nursing staff rather than residential care workers. Staffing varies across BIRP TLPs for a number of reasons including: the number of beds available, client needs and goals, the type of program offered.

Figure 3a: NSW TLP Core Program Staff

	Residential Manager	Clinical Coordinator	LSE, RCW, RA	Employment Award
Albury	0.1 FTE	0.2 FTE	2 Full time LSEs 2 Part time LSEs 6 Casual staff	Enrolled Nurse
Bathurst	0.1 FTE	0.1 FTE	6 Casual RCWs	Technical Assistants
Goulburn	0.4 FTE	1.0 FTE (fluctuates)	5 Part time LSEs 4 Casual staff	Residential Care Nurse
Hunter	0.4 FTE	0.5 FTE	3 Full time RAs	Technical Assistants
Liverpool	0.5 FTE	1.0 FTE	3 Full time RCWs 1 Part time RCW *Casual staff from EN hospital pool	Health Education Officers
Tamworth	0.5 FTE	-	2 Full time LSAs *Casual staff from EN hospital pool	Technical Assistants
Ryde	-	0.5 FTE	1 Part time RA 1 Full time Nurse	Technical Assistants
Westmead	0.5 FTE	1.0 FTE	4 Full time RCWs	Health Education Officers

* LSE= Living Skills Educator, RCW= Residential Care Worker, RA= Rehabilitation Assistants, Living Skills Assistants

(i)   Staffing Models

The staffing models adopted by NSW BIRP TLPs range on a continuum from multidisciplinary to transdisciplinary. The New Haven model based at Ryde utilises a multidisciplinary model of practise. Within this model, team members from each discipline independently complete assessments and set goals with the client. The client's progress is then reviewed at regular team meetings.

The remaining BIRP TLPs utilise staffing models that range from interdisciplinary to transdisciplinary. These programs are characterised by staff members working collaboratively on assessment and intervention. TLP staff work with the client and their family to set global rehabilitation goals and each therapist is then responsible for discipline specific objectives that facilitate the achievement of these goals. In this process all staff members are aware of the client's goals and work together towards their ultimate achievement. There is a program focus on teamwork and collaboration.

3.5   Paraprofessional/ Residential Staff

Paraprofessional/ residential staff within NSW BIRP TLPs are integrally involved with the implementation of the daily structure of the TLP. They also play a pivotal role in the facilitation of cooperation amongst program participants. Residential staff are employed within NSW BIRP under various job titles, which include:
*   Living Skills Educators (LSE) Albury/ SWBIRS, Goulburn/ SABIS,
*   Living Skills Assistants – Tamworth/ NEBIRS
*   Rehabilitation Assistants - Hunter
*   Residential Care Workers (RCW) – Bathurst, Liverpool, Westmead

(i)   Roles

Residential care workers play a complex range of roles within the TLP which may include:
*   Role modelling of appropriate social behaviours/ containment of impulsive behaviours (Willer et al 1994; Simpson et al 2004)
*   Promotion of an environment which encourages individual choice and decision making in a safe/ supervised way
*   Facilitation of a client's development of roles and self identity (Krefting, 1989).
*   Establishment of a supportive milieu that provides a consistent, supportive yet confrontational approach (Giles & Shore 1988). This approach was recommended to facilitate a clients understanding of their limitations whilst retaining a positive sense of self.
*   Assistance to develop a strong peer culture (Willer et al, 1994; Simpson et al. 2004)
*   Energising residents with adynamia (Simpson et al, 2004)
*   Facilitation of a continuous therapeutic environment where clinical interventions can be repeated and reinforced (Venzie et al. 1996)
*   Implementation of clinical interventions as designed by allied health staff

(ii)   Training and Professional Development

Residential care workers have a complex mix of duties that they undertake as part of their clinical role (see above). It is of little surprise therefore that many NSW TLP managers and rehabilitation authors have stressed the importance of adequate support and training for such staff (Strettles, 1998; Venzie et al. 1996, Sachs 1986).

All staff interviewed for this project emphasised the importance of regular support and supervision for residential care workers. Many commented that a significant

portion of their time was devoted to providing this support through both formal and informal educational opportunities and other types of support.

Support and Professional Development Strategies:
- Residential Care Worker Forum - All BIRPs which manage a TLP work collaboratively to organise a bi-annual forum for residential care workers. These forums provide opportunities for formal professional development with presentations by expert speakers and informal support through networking.
- Residential care workers are encouraged to attend professional development activities offered by their individual BIRP (for all staff)
- Specific training workshops are organised on an as needs basis (eg Diabetes management, Motivational Interviewing).
- Regular performance management and staff appraisal interviews are held with each staff member
- Regular opportunities for staff communication and collaboration (eg case conferences, staff meetings, handover notes etc)
- Staff are encouraged to complete additional external tertiary training (eg CSU course on Acquired Brain Injury)

(iii)   Recruitment and Retention

According to Venzie et al 1996, skilled paraprofessionals are an essential component in creating the continuous therapeutic environment that is crucial for the carry-over of clinical interventions within residential settings. TLPs within the NSW BIRP are, in general, serviced by an experienced, residential care worker population. Five of the NSW BIRP TLPs identified that some residential care workers, have been employed with their transitional living programs for over 10 years (Hunter, NEBIRS, SWBIRS, Liverpool and Westmead).

The Mid West Brain Injury Rehabilitation Program identified that its residential care workers were less likely to remain with the service over the longer term, due to its casual service delivery model. They did, however, identify that they have a core of 2-3 workers who have been with the program for 4 years. Mid West reported that they needed to recruit residential care staff to their casual pool approximately once a year. The training and support needs for these casual staff were reported to be time consuming.

(iv)   Residential Staff Employment Awards

In 1997 the Residential Care Worker employment award within NSW Health was rescinded. At this time each NSW BIRP TLP was required to nominate a preferred alternate employment award for their residential care workers. The process of selecting an appropriate replacement award was often guided by the Human Resources Department within each Area Health Service and was therefore approached individually by each BIRP. This resulted in a number of different employment awards being utilised for residential care workers within NSW BIRP (See Figure 3a above).

The employment of residential care workers under different award classifications has resulted in different wages and conditions for residential care workers across the BIRP. Wages within the award classification systems currently used range from $756.50 a fortnight (Residential Care Nurse –level 5) to $1580.76 a fortnight (HEO Graduate- 1st year). These figures do not include penalty rates that also accrue with shift work.

3.6 Residential Staff to Client Ratios

A common feature of staffing within NSW BIRP TLPs is the ratio of residential staff to clients. Of the residential programs that had a minimum of four beds available all reported that it was extremely difficult to manage more than four residents with a single staff member (five of the eight programs have 4 or more beds). For this reason many commented that they would rarely accept more than four clients at a time. A number of services further added that they would stagger admissions and reduce the bed number to three if they had a resident who was exhibiting challenging behaviour or required high levels of supervision.

NSW BIRP staffing ratios appear to reflect those adopted by TLPs in other states:
- The Epworth TLP, which is based in Melbourne (Victoria), has two paraprofessional staff members from 11:30am- 3:30pm each week day with a single staff member at other times. Epworth has up to 7 clients at one time, with 4 in a shared residence and 3 in individual apartments. Clients within the individual apartments have much lower support needs than those residing in the house and are not expected to require daily assistance.

- Brightwater in WA has three transitional living residences which accommodate up to eight (8) residents. They identified that they have two residential staff per residence during the day and then two staff to supervise three separate residences overnight

Therefore, preliminary investigations suggest that there is a similar staff to client ratio across TLPs for clients with brain injury at a national level. This ratio is one residential care worker per four clients.

3.7 Professional Staff

(i) Residential Managers
TLPs within the NSW BIRP, except Ryde, have a residential services manager who is responsible for the administrative running of the program. This employee is responsible for tasks such as managing referrals, rostering staff and organising residential care worker recruitment and performance management. In regional services the role of residential manager is generally assumed by the BIRP program manager. The full time equivalent (FTE) position allocated to this role differed between NSW programs and ranged from 0.1 to 0.5 (Bathurst and Liverpool respectively). This difference in FTE occurs for a number of reasons including: differences in resident numbers, staffing numbers, casual staff and opening hours.

(ii) Clinical Co-ordinators
Five BIRP TLPs have a clinical or program co-ordinator, separate to the role of program manager. This person was described as being responsible for the monitoring and upgrading of individual client's living skills program within the context of the residential program and the person's goals. Programs commented that it was not advisable for the program manager and the clinical manager to be the same person due to the possibility of conflicting roles of program administration and service provision. In the five BIRP TLPs that had a clinical coordinator, this position was occupied by an occupational therapist.

Three NSW BIRP TLPs did not employ a clinical coordinator (Hunter, Albury and Tamworth). These programs reported that the client's case manager was expected to

undertake an active role in the monitoring and coordination of their client's specific program.

(iii) Allied Health

BIRP TLPs are supported by a consistent mix of allied health professionals (See Figure 3b). Allied health staff, in both regional and metropolitan areas, work within the TLP and either the inpatient or outpatient/ outreach/ community services of their BIRP. These staff may not be dedicated TLU staff members but are essentially "brokered in" as needed. No best practise guidelines currently exist regarding the mix or FTE's of health professionals required for a comprehensive TLP service.

The complement of allied health staff employed within BIRP TLPs is comparable to TLP models described in international literature (Proctor & Kaplan, 1995; Willer 1999). Some program descriptions from the USA document vocational consultants as part of their multidisciplinary staffing (Johnston & Lewis, 1991; Malec 2001). These staff members are not generally employed within the NSW Health as vocational rehabilitation is recognised as Commonwealth (as opposed to State) responsibility within Australia.

(iv) Rehabilitation Specialists

Rehabilitation specialist's who are employed by the NSW BIRP, are available as required for TLU residents and contribute to the overall TLP rehabilitation program. Regular consistent, contact from a Rehabilitation Specialist was identified by most program managers as a key requirement for successful TLP implementation.

Figure 3b: Allied Health Staffing at NSW BIRP TLPs

	Clinical/Neuro-Psychologist	Physio-therapist	Social Worker	Speech Pathologist	Recreation Officer	Occ. Therapist
Albury	0.6 FTE	0.7 FTE	0.2 FTE	0.6 FTE	-	0.6 FTE
Goulburn	0.2 FTE	0.4 FTE	0.2 FTE	0.1 FTE	-	1.0 FTE
Liverpool	0.2 FTE	0.5 FTE	0.5 FTE	0.5 FTE	-	1.0 FTE
Ryde	0.1 FTE	0.5 FTE	0.1 FTE	0.2FTE	0.2 FTE	1.0 FTE
Westmead	0.2 FTE	0.5 FTE	0.5 FTE	0.5 FTE	-	1.0 FTE
Bathurst and Tamworth	Total 0.2 FTE Allied Health**					
Hunter	0.4 FTE	0.5 FTE	0.4 FTE	0.4 FTE		0.5 FTE

* FTE: Full time equivalent

** Regional program budgets are integrated for TLP and community service provision. The figure provided in the table represents the average weekly proportion of allied health intervention provided to the TLP. The figure represents a mix of allied health disciplines including; occupational therapy, speech pathology, social Work and psychology on an as needs basis. Allied health intervention would fluctuate according to occupancy rates and client need.

3.8 TLP Costs

In September 2005 NSW Health issued a Policy Directive which set the current schedule of fees for compensable clients requiring brain injury rehabilitation services. In this directive the gazetted fee for a TLP bed day was set at $615 per day (NSW Health Policy Directive_623).

In an effort to review the relation of this figure to actual TLP running costs each BIRP TLP was asked to complete a budget table which documented the program running costs for the financial years 2003/04 and 2004/05. These figures were based on recorded and estimated costs across the programs. More accurate costings were not obtainable within the scope of this evaluation as this would have required an extensive prospective study. One TLP was not able to provide financial data for these two budget periods and thus was excluded from the data analysis.

The completed budget tables demonstrated extensive variability in the total running costs of BIRP TLP services. A major factor contributing to this variability was whether programs reported "actual budget" (as set aside for TLP) or "nominal budgets", where figures were estimated from their TLP activity levels for the year. Many regional programs did not have an allocated budget specifically for TLP services; instead they allocated a single budget across their program streams in relation to population needs. Further variability in TLP costs was also related to the differences in the award classifications under which residential staff were employed.

Variability in reported costs and occupancy rates over the two years and across the units provided limited opportunity to establish average daily bed day costs. Data trends for the 4 or 5 bed residential programs include;
- Occupancy rates ranging from 55-85%
- Average annual running costs between $360,000 to $460,000 per annum
- Reductions in running costs if services were co located and resources shared
- The revenue raised by programs was highly variable and reflective of fluctuating occupancy rates and percentages of compensable clients entering the service

3.9   Key Findings

This descriptive review of NSW BIRP TLPs gives rise to a number of issues for consideration in terms of evaluation:

1. Currently, there is no evidence in the international literature to suggest that the TLP setting is a major factor influencing clinical outcomes.

2. The Ryde New Haven program is significantly different from the other TLPs within the BIRP. The primary differences include; broad referral criteria, multidisciplinary staffing models, no residential care staff and no weekend closure.

3. Despite significant differences amongst BIRP TLPs, there is reasonable similarity in a number of key program components, including:
    - the hours of operation of the TLPs
    - the use of weekend leave is a unique feature of the NSW BIRPS and may be an important component in facilitating the interface between the TLP program and community participation
    - consistency in staffing mix (professional and paraprofessional)
    - separation of the program management and program co-ordination roles
    - consistency in staffing ratios (residential staff per client)

These similarities will facilitate the evaluation of program outcomes and lay potential groundwork for examining the intensity of therapy provided across programs. In addition, the similarity in staffing mixes and staffing ratios suggests that there may be potential to develop practise guidelines for NSW BIRP TLP services.

Chapter 4: Processes

Treatment approaches and interventions

Treatment approaches within the field of post acute brain injury rehabilitation are many and varied. Findings from the literature review have highlighted that limited information currently exists which identifies which approaches are efficacious. This chapter therefore describes the intervention approaches utilised within BIRP TLPs and compares this to current international practice.

This chapter comprises three parts including:

(i) a brief overview of approaches to brain injury rehabilitation and a description of the predominant approach within BIRP TLPs

(ii) a discussion of the six major domains of intervention utilised in BIRP TLPs

(iii) an outline of the intensity of therapy provided by the BIRPs.

4.1 Overview of Approaches to TBI Rehabilitation

Within brain injury rehabilitation there are a number of different intervention approaches. These approaches are described briefly below:

- Wholistic rehabilitation approach: is typically drawn from the medical model and functional approaches to rehabilitation, and relies on intervention implementation by a multi-disciplinary team. This is the predominant model of brain injury rehabilitation used across Australia.
- Neuropsychological approach: is drawn largely from the discipline of neuropsychology. Leading international centres include the Oliver Zangwell centre in the United Kingdom and the Barrow Institute in Phoenix Arizona.
- Neurobehavioural approach: is drawn largely from the discipline of clinical psychology. Many of the units in the Brain Injury Rehabilitation Trust within the United Kingdom and the Transitional Rehabilitation Unit led by Dr Howard Jackson are examples of this service delivery model.
- Community participation approach: draws from social models of disability and include Willer and Corrigan's (1994) "Whatever it takes" model and the Positive Everyday Routines approach developed by Ylvisaker and Feeney (1998).

Key contextual elements within BIRP TLPs

As a generalization, the predominant approach to brain injury rehabilitation within the NSW BIRP programs as a whole, and the TLPs in particular, draws from the wholistic rehabilitation approach. Within this approach, there are two key contextual elements that underpin the various interventions; these are outlined below.

(i) Therapeutic milieu

Intervention within a TLP occurs within a therapeutic milieu. This milieu is created by the physical environment in which the program is completed and by the staff involved in the program, particularly the residential care workers. This milieu supports the client in the process of learning to perform the activities, behaviours and functions necessary for living within the community (Willer et al 1999).

(ii) Individualised, goal-based rehabilitation plans

Intervention within the TLP is guided by an individualised, goal-based rehabilitation plan. These plans are developed by the client in consultation with the treating team and their family (when appropriate). Rehabilitation plans document the client's short

and long term goals and represent a shift in rehabilitation focus in which clients assume an active role in designing their rehabilitation program.

4.2   Domains of Rehabilitative Intervention

Within the framework of the two contextual elements outlined in the previous section, there are then six domains of rehabilitative intervention utilised in BIRP TLPs. Although there is considerable overlap between these various domains, it is still possible to classify the various interventions into the following domains, by examining the primary purpose of each intervention.
These domains include:
- comprehensive assessment
- intensive living skills training
- psychosocial rehabilitation
- cognitive rehabilitation
- community participation, and
- family education/ support.
These domains are discussed in relation to their mix and intensity within individual programs and in relation to current evidence based practise.

(i) Comprehensive Assessment
 "An effective transitional living program "should be a decision point for the client, family and staff about the clients' independent living potential" (Sachs1986 p.9).

In the field of brain injury rehabilitation, service providers are frequently asked to assess how much supervision a client requires to be able to live in the community. This question is often difficult to answer while clients are in a hospital environment, as the structure and routine in these settings can mask a client's functional abilities and limitations (Olver and Harrington, 1996).

The TLU is viewed as an appropriate venue for conducting assessment of client support needs, as it facilitates comprehensive assessment by providing a challenging and less structured physical environment (as compared to an inpatient setting). The TLU also provides an opportunity to assess clients over an extended time period.

BIRP TLPs are generally staffed twenty four (24) hours a day, five days a week. This affords an extended period of time in which to observe and assess a client's functional skills. Many authors have recommended that these types of assessments should be completed over an extended time so that staff can assess "what the client does" and not what they can do in a one off therapy assessment (Leland et al, 1988).

The extended assessment period of a TLP also provides the rehabilitation team with important information about a client's learning potential, interpersonal skills and behaviour. This information is crucial for decisions regarding the design and implementation of further post acute rehabilitation intervention.

(ii) Intensive Living Skills Training
Clients admitted to BIRP TLPs are generally independent or require only minimal assistance with basic self care tasks. The focus of TLP therefore, tends to be on providing training and retraining in more complex domestic, independent living and community based activities (Mid Western Brain Injury Rehabilitation Program, 1999).

Within a TLP, clients are supported as they undertake routine household planning, budgeting, shopping, meal preparation and community based activities Their

performance is encouraged through a process of praise, empathy and review provided by therapy and residential care staff (Simpson et al 2004). Client programs are graded and assistance is reduced as clients become more skilled in completing tasks or components of tasks.

Aside from specific activity based treatment, intervention within TLPs can also be directed at skills training which focuses on specific impairment areas such as balance, visual scanning and fitness etc.

Intervention within TLPs is also focussed on assisting clients to develop a consistent daily routine, which is viewed by many rehabilitation authors as a precursor for successful transition to community living (Sloan et al 1996; Lentz & Groves 2002). Establishment of a consistent routine can require large amounts of structure, activity cueing and prompting by staff members. This level of structure is then reduced as a client demonstrates internalisation of these routines and is able to effectively implement self organisation skills.

The functional, living skills focus of the TLP is also considered to be an effective intervention strategy in promoting a clients understanding of their skills and limitations. One staff member commented that it is often through the supported experiences of success and failure in tasks that a client develops insight into their impairments and activity limitations. This insight can then provide the motivation to learn compensatory strategies to facilitate task performance. This observation is supported by current research findings.

(iii) Community Participation

Within BIRP TLPs, clients are regularly assisted to access commercial and recreational resources within the community with the aim of developing skills which will enable them to access similar resources in their home community following discharge (Sachs, 1986).

All BIRP TLPs reported incorporating a minimum of two community based activities a week for all clients. These activities included purchasing foodstuffs from the local supermarket for the household and planning and completing a recreational based activity in the community.

The frequency of community access opportunities for individuals differed between BIRP TLPs and also between individual TLP clients. Most programs identified that as a client developed greater levels of independence they were encouraged to access the community more frequently and with less staff support.

(iv) Psychosocial Rehabilitation

Inability to engage and interact at a societal level is a particular problem for people after a brain injury (Brown et al 2003). It is not surprising then to note that psychosocial rehabilitation forms an integral part of the TLP therapeutic environment.

Psychosocial rehabilitation, within BIRP TLPs, is facilitated by a number of intervention strategies. These include; individual skills based therapy, group based therapy, supported social opportunities within the community and peer support. Each of these strategies is described below.

Individual social skills training: Completed with speech pathologists in both individual and group settings. Specific foci of intervention include the pragmatics of conversation and recognition of verbal and non verbal cues.

Supported social participation opportunities: Allied health staff and residential care workers facilitate social opportunities both within the TLU residence and the broader local community (Simpson et al 2004). These interactions are monitored by staff and feedback provided to reinforce positive behaviours/ skills and/or introduce strategies to reduce negative interactions. Within these contexts TLP staff model appropriate social skills and demonstrate the accepted social tenants of respect and tolerance.

Peer Support: The TLP utilises a peer culture, where possible (smaller programs have limited opportunities for peer interactions). In this culture clients encounter peers who are experiencing or have experienced similar issues of loss and adjustment and thus help to "normalise" their own recovery process (Lentz & Groves 2004). Peers also provided feedback to clients about their skills and behaviour within the TLU. There was acknowledgement that this feedback was often perceived as more readily accepted than that which was provided by TLP staff.

Psychosocial interventions within the TLP are also directed at assisting a client cope with the psychological stress of adjusting to a brain injury. Staff and peers provide emotional support to clients as they understand and come to terms with the nature of their impairments and activity limitations. All BIRP TLPs had access to specialist psychologic services/ staff and recognised this as an essential component of TLP intervention.

(v) Cognitive Rehabilitation

Cognitive rehabilitation involves the systematic integration of interventions directed at the remediation of cognitive deficits as they arise within functional tasks. According to Wilson (1989) cognitive rehabilitation can apply to any intervention strategy or technique which intends to enable clients and their families to live with, bypass, manage, reduce or come to terms with cognitive deficits precipitated by injury to the brain (p117).

Over the past few years, TBI rehabilitation literature has witnessed growing support for these types of intervention. This is evidenced by the increasing number of intensive cognitive rehabilitation programs being described within rehabilitation publications (Malec 2001; Cicerone et el 2004). Cognitive rehabilitation programs have generally been delivered within a day program format and have had a primary focus on increasing self awareness and developing compensations for cognitive deficits. In programs described by Cicerone and colleagues (2004) cognitive groups feature as a major component of a therapeutic intervention, with one program incorporating 2 hours of cognitive group therapy 3 times a week.

Within BIRP TLPs cognitive rehabilitation principles underpin many aspects of the rehabilitation program. For example clients completing TLPs are provided with a weekly timetable/ diary and provided with consistent encouragement and assistance to plan, organise and review this document on a regular basis. Cognitive interventions are also implemented on an individual, discipline specific, level being directed at the client's unique, individual goals.

Three BIRP TLPs reported having regular group based activities that incorporated cognitive rehabilitation principles. These were "diary review", "goal review" and "memory group". In these groups clients reviewed their progress with the aim of acknowledging their success and failures. Current literature highlights that this process can lead to greater self awareness and motivation for change.

(vi) Family Education

"The type of interaction the client has with their family can assist or discourage the transitional process" (Lammi 2001).

Family adjustment appears to be supported within BIRP TLP's in three ways; Regular meetings (formal and informal), education, and individual support. Each of these is described briefly below.

Meetings: TLP staff identified that formal and informal meetings were arranged with a client's family members on a regular basis. In these meetings the client's progress with goals, functional skills and levels of activity participation during weekend leave are discussed. TLP staff identified that families were encouraged to identify whether clients were able to successfully implement strategies they had been learning at the TLU, into their home environment and to discuss any concerns that may have arisen over the weekend period.

Education: Education with families tends to be specific to the individual client and their family members and is provided on an ongoing basis. Some programs reported that they offered education groups for families on a regular basis. One TLP (Albury) also identified that they had run a spouses group. In these groups family members were provided with information about brain injury and the behaviours and emotional changes that can occur during recovery.

Individual Support: The majority of BIRP TLP's have access to social work services for family support. Social work intervention is provided on an individual and as needs basis.

4.3   Therapy Intensity

The intensity of intervention provided by within BIRP TLPs was graded according to the skills, difficulties and goals of each TLP client. Programs generally provide a mix of group and individual therapy and unstructured time commensurate with the clients identified needs, goals, difficulties and skills.

(i) Group Interventions

BIRP TLUs that accommodated three (3) or more clients, utilised group activities within their program structure. The appropriateness of group versus individual treatments has been relatively unexamined in post acute programs (Cope et al 1991). Many clinicians within the BIRP reported that they felt therapeutic groups offered at their TLP had a number of clinical advantages. These included: peers' involvement in providing feedback, structured opportunities for social communication, facilitation of adjustment through group discussions and activities closer to real life situations.

Each BIRP TLP offered a variety of different types of intervention groups. A detailed list of the specific groups implemented at each TLP can be found within the program descriptions (Appendix 5). A summary of the groups is provided over the page.

Standard Activities/ Groups (offered within all programs)
- Meal planning and preparation
- House meeting (to divide chores and discuss any problems/ issues)
- Shopping
- Timetable/ activity planning

- Recreation planning/ management

Specific Groups
- Social communication
- General exercise/ circuit class/ walking/ swimming/ tai chi/ balance
- Pre vocational
- Newspaper
- Stress management
- Drug and alcohol
- Education and adjustment
- Diary review
- Goal review
- Weekend planning
- Anger management
- Memory

The ability of NSW BIRP TLPs to incorporate group based interventions in their programs was dependent on a number of factors, including: their geographical location, client goals, client mix, staffing levels and client numbers. Smaller programs such as Kameruka (Tamworth) and Bunyarra (Bathurst) were not able to provide group based interventions within their TLP.

Larger programs such as Hunter, Liverpool and Tarkarri (Albury) also involved community clients in some of their TLP groups, for a limited period. Community clients were included in groups that addressed their continuing rehabilitation goals.

Individual Intervention
As identified previously, intervention within BIRP TLP's is completed within the backdrop of a continuous therapeutic environment. This includes both the home-like physical environment where the person resides for the duration of their admission, and the therapeutic program created by the therapy and residential care staff. A consistent pattern of intervention intensity was demonstrated across all programs. Intervention included approximately 3 hours of individual therapy per day and up to 15 hours of group based therapy per week (for those programs with more than 2 beds).

4.4 Key Findings

1. Current TBI literature is relatively inconclusive about effective post acute rehabilitation interventions (Phillips et al 2004). This chapter has highlighted the interventions supported by NSW BIRP TLPs.

2. In terms of the NSW TLP program evaluation, Stage Two of the project may facilitate examination of possible links between the total intensity of intervention provided to BIRP TLP clients and changes on global outcome measures. However, it will not be able to identify the individual components of intervention which have influenced these clinical outcomes.

3. By discussing current international practise this report has identified that cognitive rehabilitation appears to form a greater group based component of some international post acute rehabilitation programs (particularly day programs). The question of whether more attention should be paid to specific group based cognitive interventions within TLP could be an appropriate issue for the TLP network to further explore.

Chapter 5: Processes

TLP Functions within the BIRP Continuum

BIRP TLPs occupy unique positions within the post acute rehabilitation continuum of their individual BIRP service. These continuums support different rehabilitation pathways and include programs such as outpatient, day programs, home and community based services and case management. Within each BIRP the TLP performs roles which are in alignment with their individual BIRP service needs.

A crucial step in evaluating TLPs is to clearly identify the key rehabilitation roles or functions that they support within their BIRP continuum. Efficacy can only be established when these functions are documented and the programs' productivity mapped against these functions.

The current chapter outlines:
    (i) three different rehabilitation functions performed by BIRP TLPs and
    (ii) the associated issue of length of stay.

5.1 TLP Functions

In discussion with TLP staff across NSW, it was clear that there were three discrete and different rehabilitation functions performed by BIRP TLPs. Two of these functions focussed on providing intensive post acute rehabilitation relatively soon after a client's injury. The third function, in comparison, supported clients who had been residing in the community for an extended period of time.

For this report, the three discrete TLP functions have been termed; Transitional living, Community resettlement and Community management. In general, the primary function performed by TLPs in metropolitan areas was Transitional living with smaller numbers of clients being admitted for Community management and community resettlement. In comparison, regional TLP's were more likely to perform all three TLP functions equally. Each of these functions is described in more detail below:

(i) Transitional Living

This function involves providing rehabilitation programs for clients who continue to require intensive rehabilitation, to transition from the structured hospital setting to their home. In this process, appropriate clients are admitted to the TLP relatively soon after their injury (often within 9 months) and generally directly from an inpatient unit. Clients enter the program and work collaboratively with staff to set personal goals. Programs are on average 4-7 weeks in duration and primarily have rehabilitation goals of increasing independent living skills, increasing community participation and facilitating adjustment to TBI. In this process the TLP facilitates a client to transition from the role of "patient" to "active life participant".

In performing this function, the TLP acts as a discrete step along the BIRP continuum– situated between inpatient and non inpatient programs.

(ii) Community Resettlement

The community resettlement function of BIRP TLPs involves the TLP and non inpatient services working in tandem from the day of the clients' arrival. This function is more commonly performed by regional TLPs and has evolved in response to

clients requiring or requesting a shorter length admission. Within this rehabilitation program, clients generally spend a short period of time at the TLP (1-2 weeks). In this time they meet BIRP team members and complete initial assessments, after which they set personal goals and an outpatient and home based intervention program is developed. The home based program is an alternative to a continued residential program and is usually more acceptable to clients who have already spent a long time in metropolitan inpatient units. The home based program is usually less intensive than the residential based TLP. Clients supported within this function may also be referred to other community services for ongoing rehabilitation therapy and support.

In the resettlement process clients may (but do not have to) be encouraged to regularly return to the TLP for their progress to be reviewed and home programs to be updated. This function was felt to be a cost effective method of community intervention implementation in regional areas (saving on travel costs for therapy staff). Within this function the TLP could also provide an opportunity for clients to receive a short intensive rehabilitation burst in situations where they can not access specialist services in their local area.

(iii)   Community Management

The third function which BIRP TLPs perform is that of Community Management. This rehabilitation function provides a TLP for clients who are greater than 1 year post injury (sometimes many years post injury) and who have commonly spent time living in the community prior to their admission. For these clients an event or decision has often precipitated the need for change in their current living arrangements eg a young adult wanting to move out of the family home. The intensity of the rehabilitation program required to assist clients to achieve such a goal can be provided in a TLP.

Clients who are admitted for community management often arrive with pre-determined goals (established in consultation with the community outreach team). The TLP may be utilised for completing living skills assessments, or as an environment for assessment and intensive living skills training. Programs can range in length from a couple of weeks to months. The majority however are relatively short programs.

5.2   Length of Stay

Length of stay is not currently collected as a data variable within the BIRP TLP MDS. This has meant that there has been limited ability to determine an average length of stay for TLP clients both across the BIRP as a whole and within individual BIRP TLPs.

Simpson et al (2004) documented the average length of stay for the Liverpool TLP as seven weeks. They noted that this length was "considerably briefer" than other national and international programs. Anecdotal evidence collected within interviews with TLP staff, highlighted a general perception that BIRP TLP's, particularly those in regional areas were likely to have an even shorter average length of stay than that identified by Liverpool.

BIRP TLP length of stay, may vary according to the TLP role/ function described above. Further detailed analysis is required to ascertain whether there are significant differences in the length of stay profiles across the BIRP TLPs linked to the three TLP functions. It is also unknown at this stage whether the length of stay for each function has a direct impact on clinical outcomes achieved.

5.3   Key Findings

1. BIRP TLP's perform three discrete rehabilitation functions. These functions have been labelled "transitional living", "community resettlement" and "community management". The functions support three different rehabilitation pathways within the BIRP network.

2. To evaluate the effectiveness of BIRP TLP's the above three functions may need to be reviewed individually and within the context of each individual BIRP service across the state.

3. When designing a TLP evaluation, it will be important to consider the following:
    *   TLP Function
    *   Length of stay

    * it will be also be important to develop consistent criteria for defining admission and discharge dates for each function so that a client' length of stay can be consistently determined.

Chapter 6: Outcomes

Outcome measurement, in the field of TBI rehabilitation, is widely recognised as a challenging and difficult task (Beaumont et al 1999; Williams et al 1999).

This chapter:

(i) outlines a framework for reviewing outcome measurement
(ii) outlines the unique challenges that face outcome measurement within the BIRP TLP population
(iii) canvasses the current outcome measurement practises employed within NSW BIRP TLPs

6.1   Framework for BIRP TLP outcome measurement

There are a wide range of outcomes that are important to consider when designing evaluation strategies for health care services. The figure below illustrates outcome measurement as it has been conceptualised within this report and provides a framework against which current practice can be discussed. The framework highlights that outcomes can be categorised according to whether they relate to service implementation (service outcomes) or individual client achievements (clinical outcomes). Current literature supports the combination of both types of outcome measurement for comprehensive service evaluation.

Figure 6a: Rehabilitation Outcome Measurement
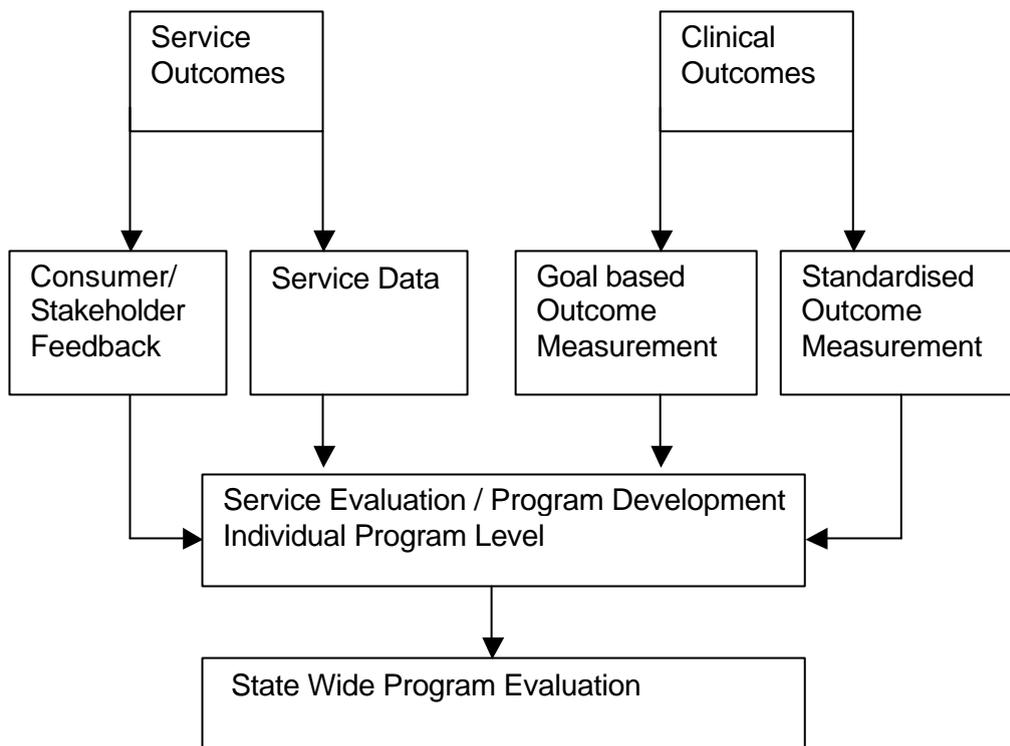
Service Outcomes: are those outcomes that relate to the overall running of the program. They include data such as occupancy rates, bed days, length of stay and numbers of admissions. This data is routinely collected by all NSW health services and is used as a crude measurement of service activity levels.

Service outcomes also include consumer feedback data which can be collected from a number of program stakeholders. Stakeholders can be clients, family members, program staff and/or external providers. Traditionally, feedback collected is generally focussed on the stakeholder's level of satisfaction with key components of a program eg; staffing levels, staffing attitudes, program design and continuity of care. Alternative types of consumer feedback however may also provide worthwhile data.

The collection of consumer or stakeholder feedback, as a component of service evaluation, is widely supported and encouraged within the context of the Australian health care industry (Meehan et al 2002). This data is recognised to be valuable, not only in evaluating the quality of a service but in the continuous process of service development and refinement. Within Australia there has been increasing awareness and, in fact, a growing pressure on all services to collect consumer feedback on a regular and consistent basis (Lee Hargraves J, Hays R., & Cleary P, 2003).

Clinical Outcomes: represent the benefits/ gains that each client obtains over the course of their health care admission. Figure 6a illustrates that there are two different approaches to measuring clinical outcomes within the field of rehabilitation. The first approach is an individualised approach, which acknowledges the uniqueness of each person's injury and aspirations (Beaumont et al 1999). In this approach individual client goals are established with clients at the beginning of their rehabilitation and their outcome is measured in terms of their achievement of these goals.

The second approach involves measurement of a client's status against a standard set of global outcomes. These outcomes are based on a subtle assumption that a client's desired outcomes are similar to those of any person (Evans, 1997) and relate to what is expected in terms of normal adult functioning. They are measured by collecting information about a clients functional status, living status and levels of activity engagement prior to commencing a program and then at discharge or follow-up from a program.

Historically the standardised, global outcome measurement approach has dominated in service evaluation literature. Reasons for this domination include; standardised measures have a standardised scoring system which facilitates between subject and between program comparisons (Powell et al. 2005) and they also have the potential to reflect the combined interventions of rehabilitation teams rather than discipline specific objectives (Smith et al 2001). In the past decade, however, there has been a greater acknowledgement of the limitations of this approach, particularly within the diverse and heterogeneous TBI population (Beaumont et al, 1999; Williams et al 1999). In response to this the individualised outcome measurement approach has grown in popularity and is now often used in combination with standardised outcome measures.

6.2   Unique Challenges of Outcome Measurement in BIRP TLPs

There are many factors that make outcome measurement in the area of brain injury rehabilitation challenging. These factors include; the heterogenous nature of the brain injury population (Chestnut et al 1999); the lack of consensus on the way to measure rehabilitation outcomes and the need for measures to be sensitive to the stage of rehabilitation in which the client is involved (Powell et al 2005).

In addition, findings from this report have revealed, that the unique nature of NSW BIRP TLPs, adds further complexity to the design of comprehensive strategies for

outcome measurement. This report has identified that NSW TLPs; have small client populations; have different rehabilitation functions; have short lengths of stay and are underpinned by the concept of intervention being completed within a therapeutic milieu. Each of these characteristics needs to be carefully considered when designing a TLP evaluation frame work. Examples of how these characteristics can influence outcome measurement are discussed below:

(i) Small Population

The NSW, BIRP MDS figures (as described in chapter 2) highlight that the numbers of clients moving through individual BIRP TLPs each year is very small. On average each BIRP TLPs provides rehabilitation programs for between 10-15 clients over a 12 month period.

Small client numbers, such as those identified in this report, pose a challenge to programs wishing to demonstrate their effectiveness. The challenge relates to the requirement of larger sample sizes to statistically demonstrate that an outcome is more than just a chance occurrence. For this reason it is essential to review the possibility of congregating or pooling BIRP TLP data in meaningful ways for service evaluation.

(ii) Different Rehabilitation Functions

This report has identified that NSW TLPs perform three different types of rehabilitation functions. These functions have been defined as; transitional living, community settlement and community management. Each of these programs has different aims and objectives and occurs at different stages over a client's recovery.

Research has identified that clients participating in post acute rehabilitation will have differing outcomes according to their time post injury and their injury severity (Simpson et al 2004; Evans, 1997). With this in mind, comparison of clients participating across the three different types of programs offered within BIRP TLPs is likely to be inappropriate. Any data pooling within the a TLP evaluation will only be effective if a consistency in time post injury and injury severity levels can be established within each program or function.

(iii) Complexity of Measuring the Impact of a Therapeutic Environment

A major component of TLP intervention is the therapeutic milieu created by staff and the physical residential environment. The TLP environment provides a context sensitive approach to rehabilitation. This approach has been described by Ylvisaker and colleagues (2002) and focuses on enabling an individual's functional participation in real world activities. Key features of the context sensitive approach include;

- Participation of an individual in identifying their rehabilitation needs
- Engineering an environment to reduce the impact of an individual's disabilities
- Providing structured support and
- Facilitating the modification an individual's expectations for task performance.

Participant observation is one methodology employed frequently within ethnographic studies to measure the impact of a specific environment. This methodology involves observing environments and recording all interactions within this environment over a set period of time. This by its nature is highly resource and time intensive. This approach to TLP evaluation is unlikely to be feasible in the time pressured and resource limited environment of health care.

Current evaluation literature offers few alternative options for methodologies which could facilitate the measurement of the impact of the TLP treatment environment. Without such methodologies it becomes extremely difficult to identify the aspects of TLP interventions which contribute to positive client outcomes. It also means that evaluation of individual program components may not provide a comprehensive picture of TLP efficacy.

Summary
Malec and Basford (1996) in their systematic review of post acute rehabilitation, state: "multi centre studies are necessary to acquire adequate data to support estimates of benefits and cost effectiveness" (Malec & Basford, 1996). Their findings are confirmed by this project investigations, which have highlighted that; (a) there is need for outcome data across BIRP TLPs to be pooled (b) Valid data pooling criteria need to be developed for meaningful evaluations and (c) All evaluations will need to considered within the context of the therapeutic environment at each TLP.

6.3   Current Outcome Measurement Practice within BIRP TLPs

(i)   Consumer/ Stakeholder Feedback
All BIRP TLPs collect consumer/ stakeholder feedback and have been engaged in this process in varying capacities for at least the past five years. The most common type of feedback collected by BIRP TLPs is client satisfaction data. This type of information was consistently collected by all programs, via questionnaires; semi structured interviews and/ or focus group discussions.

BIRP TLP staff identified that consumer / stakeholder feedback was regularly reviewed by the program manager and/or co-ordinator. The results were then presented at program planning days for discussion. A number of staff identified that consumer feedback had prompted modification of their TLP intervention and program processes. These modifications were then re-examined again as a part of the quality improvement cycle.

Consumer data is currently collected and utilised at an individual program level within all BIRP TLPs. Consumer data is not however collected in a standardised format and is not shared across the program network.

Two TLPs (Westmead and Liverpool) within the BIRP identified that they also collected TLP staff/ stakeholder satisfaction data. Feedback from staff surveys was then utilised to adjust program structure and improve staff training and support for staff working within the TLP.

(ii)   Standardised Service Data
All BIRP TLPs collect standard service data such as admissions, discharges, bed days and occasions of service. These figures are reported via different mechanisms at each site to different administrative bodies eg bed days submitted to local hospital administrators. The data is ultimately stored within the Health Information Exchange (HIE- data repository) which is supported by the NSW Department of Health. This data has been noted to have inaccuracies.

Service data, such as those listed above, are utilised to report on service activity levels. This data has a limited potential to be used in service evaluation, particularly when considering the effectiveness of intervention or quality of services being provided.

(iii)   Individual Goal Based Outcomes

All BIRP TLP clients have a goal-based rehabilitation plan which guides therapeutic intervention and can be used to evaluate a client's progress. Goal plans are developed in consultation with the client and the rehabilitation team on admission to the TLP. They document the unique goals that a client is working towards. Evaluation of a client's progress is measured by the achievement of their pre determined goals.

Goal based measurements are readily acknowledged to be important at a clinical level in evaluating the efficacy of a particular intervention strategy. To date goal based measurements have had a limited ability to be used feasibly as an evaluation mechanism at a broader service level. A single TLP within the BIRP has initiated a preliminary investigation into whether individual client goals, set within their program, can be congregated effectively. This project is in its infancy but may hold promise of strengthening the possibility of reporting and analysing individual goals at a service/system level. Further development in this area would be required if it were to be initiated as an outcome measurement strategy to be utilised across the BIRP TLP network at this time.

(iv)   Standardised outcome measures

Utilising standardised outcome measures to evaluate clinical practise involves (a) Identifying suitable measures that will rate the skills, knowledge or activities that rehabilitation programs are targeting and (b) Establishing that these measures are sensitive to outcome change over the rehabilitation program length.

All BIRP TLPs participated in the Brain Injury Outcomes Study (BIOS-Tate et al 2004) which was described in detail in the literature review section of this report. This study trialled 9 different standardised measures across all services within the BIRP. Findings from this study highlighted that most measures had merits and limitations, with the study being unable to make specific recommendations for outcome measurement in TLPs.

Following the BIOS study, the Liverpool TLP, implemented a pilot research project with the aim of assessing four standardised outcome measures, focussing specifically on their efficacy in measuring TLP clinical outcomes. These measures were the; Sydney Psychosocial Reintegration Scale (SPRS, Tate et al, 1999); The Mayo Portland Adaptability Inventory (MPAI-3, Malec & Thomsen, 1994); the Brain Injury Community Rehabilitation Outcome Scale (BICRO-39, Powell et al, 1998) and the Assessment of Living Skills and Resources (ALSAR, Williams et al, 1991). Data was collected for a total of 50 clients and the analysis of this data demonstrated three measures; the MPAI, the SPRS and the ALSAR were able to detect significant change within the Liverpool TLU sample.

Further analysis of the MPAI, SPRS and the ALSAR indicated that the SPRS was more sensitive than the MPAI (in detecting change) and that the sensitivity of the ALSAR could possibly be enhanced by expanding the range of items assessed. As a result of these findings, the Liverpool program routinely administers the SPRS on admissions and discharge for TLP clients and is in the process of developing a modified ALSAR scale.

Two other programs (Hunter and Mid West) have also instigated the routine collection of global standardised measures for all their post acute rehabilitation services. These programs elected to utilise the MPAI (version 4) which was revised in 2003.

6.4 Key Findings

1. BIRP TLPs currently utilise a broad range of outcome measurement strategies to monitor and evaluate service provision. This practice is in alignment with current service evaluation literature, which recommends outcome measurement over multiple domains.

2. To date TLP evaluation has occurred at an individual program level only. Congregate data analysis across programs has been inhibited by the differing types of rehabilitation programs supported by BIRP TLPs, the small client populations and the limited knowledge of key client variables which could restrict or promote data pooling.

3. Congregate data analysis is required to demonstrate the efficacy of TLP intervention. Congregate analysis can potentially occur across both service and clinical outcome data collected at BIRP TLPs. At this time, the collection of global standardised outcome measures (clinical outcomes) appears to be the most efficient and achievable method for facilitating data pooling.

4. Outcome measurement trends, in TBI rehabilitation, currently support the collection of both global outcome measures and client goal achievement (Williams, 1999). It is essential that data collection across BIRP TLPs continues in both domains to facilitate effective evaluation of the heterogeneous TBI population.

Chapter 7: Pilot Study

The key findings from Chapter 6 identify that effective evaluation of BIRP TLPs will be enhanced by congregate data analysis (data pooling) and comparisons of both clinical and service outcomes across the TLP network.

For these two strategies to be implemented a number of key issues need to be addressed. These include:

1. Identifying standardised outcome measures that have the potential to measure change over the duration of a client's admission to a TLP

2. Collecting detailed client data to establish whether individual BIRP TLPs service similar populations. This must be established before valid methods of data pooling can be developed

3. Analysing current TLP referrals to assess whether all referred clients can be classified within the three BIRP TLP function streams; Transitional living, community resettlement or community management.

To achieve these goals the TLP Steering Committee has agreed to initiate a pilot project. It is envisaged that the results of this project will assist in the development of an effective evaluation frame work for NSW BIRP TLPs. A brief overview of this project (which forms Stage 2 of the project) has been provided in Figure 7a (see next page).This pilot project was initiated in January 2005 and data is being collected for a 12 month period. Analysis of this data will be completed in March 2006 and will be documented within the Stage 2 Evaluation Report due for completion in May 2006.

Figure 7a: Flowchart of Pilot Project Development and Implementation

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┌─────────────────────────────────────────────────────────────┐
│ Stage 1:        Outcomes Workshop                            │
│   • TLP steering committee members reviewed 6 standardised   │
│     measures prior to workshop and results discussed         │
│   • Two presenters outlined current practice in clinical     │
│     outcome measurement at a state and national level        │
│   • Participants discussed "what" outcomes were seen as      │
│     important to measure                                     │
│   • Determine need for two measures; a participation measure │
│     and IADL status                                          │
│   • Selection of MPAI * (participation measure), further     │
│     IADL scale review required                               │
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│ Stage 2:        Further Literature Review                    │
│                                                              │
│   • Identification of the SMAF** IADL scale                  │
│   • Circulation of scale                                     │
│   • Agreement to include within pilot                        │
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│ Stage 3:        Ethics Approval                              │
│                                                              │
│   • Discussion with Ethics and Quality Improvement           │
│     Committees within each Area Health Service               │
│   • Three ethics submissions completed – Liverpool,          │
│     Westmead, Albury (SWBIRS)/ Goulburn (SABIS). Hunter,     │
│     Mid Western and Ryde Area Health Services determine      │
│     that project was QI and did not require ethics approval  │
│   • Ethics approvals obtained as required                    │
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│ Stage 4:        Data Collection                              │
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│ Stage 5:        Data Analysis and Review of Measures         │
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Outcome Measures
* MPAI – Mayo Portland Adaptability Inventory (Version 4- Lezak & Malec, 2003)
** SMAF – Functional Autonomy Measurement Scale (Herbert, Guilbeault, Pinsonnault, 2002)

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Appendix 1

TLP Steering Committee Membership

Adeline Hodgkinson	GMCT Brain Injury Rehabilitation Directorate
Gaurav Tandon	GMCT Brain Injury Rehabilitation Directorate
Kathy McCosker	Hunter Brain Injury Service
Barbara Strettles	Liverpool Brain Injury Rehabilitation Service
Lyndal Ross	Mid Western Brain Injury Rehabilitation Program
Marg Macpherson	New England Brain Injury Rehabilitation Service
Lena Karlsson	Brain Injury Rehabilitation Service, RRCS
Jeremy Gilchrist	Southern Area Brain Injury Service
Bonnie Conway	Southern Area Brain Injury Service
Cheryl Duncan	South Western Brain Injury Rehabilitation Services
Louise Diffley	Westmead Brain Injury Rehabilitation Service
Jill Hummell	Westmead Brain Injury Rehabilitation Service

Further Contributors

Annabell Gibson	North Coast Head Injury Service
Irena Gordon	Illawarra Brain Injury Service
Monique Edwards	Dubbo Brain Injury Rehabilitation Service
Grahame Simpson	Liverpool Brain Injury Rehabilitation Unit

Appendix 2

History of TLP within the BIRP
In 1989 an Expert Advisory group was established by the NSW Department of Health to make recommendations for the practical implementation of a state wide specialist brain injury rehabilitation service network.

One of the recommendations made by this committee was that independent living/ transitional accommodation facilities are established in identified centres within the BIRP network. It was suggested that these centres would provide rehabilitation programs to patients who were transitioning from inpatient rehabilitation units to community environments and thus reinforce the strong, community focus of the NSW BIRP network (Mid West Brain Injury Rehabilitation Program, 1999).

Each Area Health region in NSW was required to submit a specific proposal for the establishment of brain injury rehabilitation service provision in their area. This resulted in each area having to determine the unique needs of their population and types of services that would be implemented to effectively meet these needs.

Ten (10) of the eleven (11) Area Health Services, submitted proposals to the Joint Management Committees that included the construction, or acquisition of a transitional living residence. For some Areas the residence proposed, consisted of a "self contained unit" attached to their primary rehabilitation hospital (Ryde, Bathurst and Dubbo). For others the residence proposed was that of a free standing building within the grounds of the base hospital (Tamworth & Goulburn). The third and most frequent residence proposal consisted of purchase of a private residence within the community (Westmead, Lidcombe/Liverpool, Hunter, Illawarra and Albury).

A single health region, Northern Rivers determined that their geographical region was too vast to support a single transitional living residence. They therefore proposed that they receive a recurring funding budget that would facilitate the employment of living skills trainers for short term contracts. Trainers would be employed within clients' local community to provide support to the client as they returned to their home.

In 2005 the picture of NSW BIRP TLPs is very different to that which was originally proposed in 1989. Over the last 15 years the following changes have been observed:
- Closure of two TLPs (Dubbo and Illawarra)
- Relocation of two TLPs (Liverpool and Bathurst)
- The establishment of home based TLPs (Bathurst, North Coast)
- Moving from opening 7days a week to 5-6 days (all programs except Ryde).
- Expansion of the traditional TLP role for some programs, to encompass day programs for community clients (Albury, Hunter) and the provision of accommodation to assist access to specialised therapy services (regional).

The above changes have developed over time and according to the needs of the client group and various area health services. Many of the changes have impacted significantly on financial costs of TLP services and the functions which they perform.

Appendix 3

Project Methodology

A large amount of literature and historical data for this project was provided by Michelle Lammi and Claire Woodhouse from Royal Ryde Rehabilitation Centre. This information had been collected in a previous research project that had been completed for the New Haven Transitional Living Program located at Royal Ryde. Their sharing of this information is gratefully acknowledged and appreciated.

Further information was collected via the following means:
- Interviews with managers and clinicians at each adult NSW BIRP
- Analysis of a minimum dataset from each TLP
- Regular Steering Committee meetings to discuss and review data collected
- Literature Review – Medline, CINAHL, Cochrane Collection and OT Seeker.
- Internet Searches
- Informal contact with TLP program managers nationally and internationally
- Organisation of a workshop to develop clinical outcome measurement strategies

Appendix 4

Post Acute Rehabilitation Clinical Outcomes Studies (Residential Programs)

Authors	Program Description	Sample	Outcomes Measured	Results
Burke W.A., Wesollowski M.D. & Guth M.L. (1988)	Interdisciplinary residential program focussing on behaviour management, social skills training, cognitive training, vocational rehabilitation ALOS – 204 days	N=39 (graduates) N=5 (dropouts) Adolescents and adults Average time since injury = 4.3 years	Living Status Employment Status At admission, discharge and follow-up (3-12 months)	On discharge: 69% lived in a less restrictive setting than at admission 67% were employed At follow-up 50% of the original sample continued to live in less restrictive settings and 50% remained employed.
Cope N, Cole J, Hall K, Barkan H (1991)	18 post acute services across 4 states in the USA. Programs within these services included; Neuro behavioural residential programs, Day programs and community/ home programs	N=145 Excluded all clients that had less than 45 days within the service continuum (N=19) Excluded clients who terminated their program against advice (N=6)	-Residential status (4 categories) -Productive status (8 categories) - Hours of attendant care (7 categories) Single blind assessors completed telephone interviews at 6, 12 and 24 months post discharge.	- Increased number of clients residing at home - Increased number of clients in competitive employment - decreased hours of attendant care support required by clients on discharge from the program - No decrease in these gains at later follow-up times ** **Authors state that savings in reduction of attendant care hours could offset initial costs of rehabilitation within several years**

Authors	Program Description	Sample	Outcomes Measured	Results
Johnstone M &Lewis F (1991)	9 residential community re-entry programs (USA) *Social learning approach - behaviour modification interventions	N=82	File audit followed by a structured telephone questionnaire 12 months after discharge - Supervision (5 cat.) - Residence - Productivity (8 cat.)	- Supervision levels decreased in 75% of participants - There was significant improvement in the productive activities category with large increases in contribution to household activities
Evans RE, Jones ML (1991)	5 residential based community re-entry programs 47% of residents received additional vocational services	N=154 (data available for N=121 at follow up)	Residential Setting Living Assistance (amount of support / supervision per day) Productive Activity (work, study, homemaker, volunteer, leisure)	80% of clients returned home after completion of the program and 84% at follow-up 65% were discharged with less than once hour of assistance a day 58% of those receiving vocational services were engaged in work or study on discharge
Harrick I, Krefting L, Johnston J, Carlson P, Minnes P (1994)	Transitional Living Centre - Ontario * Residential and day programs *ALOS residential programs 25.5 weeks * Typical Week: 4 hrs groups, 12 hrs in the community and 15 hrs of individual therapy	N=21 Clients excluded who had a length of stay less than 8 weeks All participants were classified as having a severe brain injury with an average PTA length of 52 days	- Productive activity - Financial support - Place of residence - Level of supervision (3) Clients asked "What are your main concerns at present?"	Significant improvement in functional status as evidenced by increased productivity levels, decreased level of supervision and less supported place of residence. Concerns of returning to work and independent living replaced by loneliness and depression at 3 year follow-up.

Authors	Program Description	Sample	Outcomes Measured	Results
Eames P, Cotterill G, Kneale T, Storrar A & Yeomans P (1996)	Residential behaviour management program (UK) ALOS 11 months	N=55 18 clients with hypoxic brain injuries 37 with extremely severe TBI	-Residence -Supervision level -Employment - Social Activities - Cognitive problems (6 point scale) - Residual behaviours	- Significant decrease in problem behaviours and supervision levels - increased independence unlikely to be achieved if client resided at home with parental family for a lengthy period prior to admission
Olver J & Harrington H (1996)	Transitional living unit – Epworth Victoria 4 bed house in the community and three self contained flats	N= 95	Independence in IADL tasks measured on a 7 point scale Clients interpersonal skills were also rated	Significant improvement achieved in all IADL tasks from admission to discharge At admission only 2% of clients were living independently at discharge 58% were able to live independently
Burleigh S, Farber R & Gillard M (1997)	Post acute community re-entry program (USA) 27% outpatients 33% supported apartments 40% group residential	N=30	CIQ and Life Satisfaction Index	Found no significant relationship between life satisfaction and community integration Participants with higher social integration reported greater life satisfaction The older the client the higher life satisfaction scores

Authors	Program Description	Sample	Outcomes Measured	Results
Willer B, Button J & Rempel R (1999)	Comparison of post acute residential rehabilitation program (treatment group) to control group who received rehab in their homes or a long term care facility	N=23 (residential) Who were matched to 23 community clients	HALS – (modified version) CIQ	Clients who received post acute residential rehabilitation displayed a statistically significant increase in functional abilities when compared to the control group The treatment group also displayed greater improvement in CI but this could have been due to the fact that home based subjects had higher initial CI at the first assessment.
Hayden ME, Moreault AM, Leblanc J, Plenger P (2000)	Residential program. Client receives treatment 5-6 hours a day	N= 27 (admitted from acute settings) N=27 (admitted from the community within 1 yr post injury N=9 (>1 yr post)	PEROS	All three groups showed significant increases in independence levels from admission to discharge. ALOS (acute)= 62.4 days ALOS (<1year)= 47.2 days ALOS (>1year)= 48.2 days
Hawley C, Stilwell J, Stilwell P, Davies C (2000)	10 sites across the UK -mixture of residential or outpatient services	N=563 N=507 (at f/u) Pre-post measures with no control group F/u at 18 months 47% very severe 27% severe 21% moderate	COS FIM/ FAM Recorded amount of intervention each client received	At initial assessment over 50% of clients scored as fully independent all scales of the FIM No significant relationship between amount of intervention and outcome (even after controlling for severity).

Authors	Program Description	Sample	Outcomes Measured	Results
Wood R, McCrea J, Wood L & Merriman R (1999)	2 post acute residential programs (UK) * Neuro behavioural program	N=76 Subjects excluded if they had a rehabilitation stay of less than 6 months All subjects incapable of independent life in the community prior to admission	- Level of social recovery (measured by comparing pre and post discharge accommodation types) - Employment - Persistent behavioural problems - Care support - Costs of care	Clear trend for lower dependency residence settings after rehabilitation 61% of clients were in some form of work placement or education on discharge Significant reduction in the number of care hours for subjects The majority of clients who were able to return to the family home did so without any serious resumption in family tensions. "To a great extent this can be attributed to a more organised and structured use of time."
Dekort A, Rulkens M, Ijzerman M & Maathuis C (2002)	Come Back Home Program (Netherlands) 75% residential 25% outpatient	N=20 All clients had severe brain injuries 80 % response rate to follow-up questionnaire	File audit and postal questionnaire	7 clients -paid employment 4 - unpaid employment at follow-up 3 clients studying 9 out of 11 clients were satisfied with their outcome for living 12 out of 15 were satisfied with their employment outcome Most clients requested continued support following discharge

Authors	Program Description	Sample	Outcomes Measured	Results
Simpson G, Sechney T, Lane-Brown A, Strettles B, Ferry k & Phillips J (2004)	Transitional Living Unit – Liverpool Australia Group and individual interventions offered in a community based house Average length of stay 7 weeks	N=50 Exclusions were - clients admitted to the program but discharged prior to program being completed N=6 - others N=4	SPRS MPAI-3 BICRO ALSAR Administered on admission and discharge	Results suggest that even clients with severe cognitive impairments can benefit from TLP SPRS and MPAI sensitive to improvements made in TLP Clients made significant improvements on all measures.

Outcome Measures Key

ALSAR – Assessment of Living Skills and Resources
BICRO – Brain Injury Community Rehabilitation Outcome
CIQ – Community Integration Questionnaire
COS – Community Outcome Scale
FIM/ FAM- Functional Independence/ Assessment Measure
HALS – Health Activity Limitations Survey
MPAI- Mayo Portland Adaptability Inventory
PEROS – Pate Environmentally Relevant Outcome System
SPRS – Sydney Psychosocial Reintegration Scale
*ALOS- Average length of stay