
Accommodation Outcomes and Transitions Following Community-Based Intervention for Individuals with Acquired Brain Injury

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Objectives: To explore living situation, support and participation outcomes of people with severe acquired brain injury (ABI) residing in either home-like or disability-specific accommodation settings, who were provided with 3 years of occupational therapy intervention based on the Community Approach to Participation (CAP).

To examine transitions for a subgroup whose accommodation and support model changed during this 3-year period and identify factors critical to this change.

Method: Forty-three participants who had sustained severe to extremely severe ABI, and were an average of 6.73 years post-injury, were provided with CAP intervention over a 3-year period. Living situation and support model, participation levels and accommodation transition data were collected at four time points.

Results: Participants were living in a range of home-like and disability-specific accommodation settings at baseline. The disability-specific accommodation group had mainly noncompensable injuries and required a significantly higher level of daily support at all four time points. They also received higher total hours of support, which averaged 170.83 hours per week at baseline and did not change significantly over the 3 years. In contrast, 86% of the participants residing in home-like settings had compensable injuries and received an average of 91.46 hours of support per week at baseline. This reduced to 70.97 hours per week over the 3-year intervention period, a change that was statistically significant.

Conclusion: It is possible to achieve accommodation transitions to more independent, home-like situations many years post-injury and regardless of injury severity. Home-like settings provide scope to adjust support along a continuum to reflect gains in independence, community integration and role participation that the fixed models and hours of support in disability-specific accommodation do not. Over time, these gains can flow into a significant reduction in hours of support.

Keywords: brain injury, participation, community, accommodation, transition

Many individuals who experience severe acquired brain injury (ABI) require ongoing support and specialised accommodation, often over their lifetime (Dikmen, Machamer, & Temkin, 1993; Eng-

berg & Teasdale, 2004; Kersel, Marsh, Havill, & Sleigh, 2001; Ponsford, Olver, & Curran, 1995; Sloan, Winkler, & Anson, 2007; Turner, Fleming, Ownsworth, & Cornwell, 2008). This group have

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a diverse range of support needs and preferences for accommodation and support (Winkler, Sloan, & Callaway, 2007b). Sloan et al. (2007) found that 77% of their 13 participants with extremely severe brain injuries reported a change in their living situation following injury and 46% required 24-hour supervision or assistance. At 8-years post-injury, over two thirds of the participants were living with parents or family, or within disability shared supported accommodation (SSA) or residential aged care (RAC).

The RAC facilities provide nursing-level care for individuals at the end stage of their life and are not designed for young people with ABI (Winkler, Farnworth, & Sloan, 2006). Young people residing in this environment report social isolation, limited opportunities for recreation or leisure activities and a lack of participation in the community (Winkler et al., 2006). In a study of 330 people under the age of 60 living in RAC, 44% received a visit from a friend less than once a year or never, 21% went outside seldom or never and 34% almost never participated in community-based activities such as shopping, leisure activities or visiting friends and family (Winkler et al., 2006).

Winkler, Farnworth, Sloan, Brown and Callaway (2010) conducted a survey of 128 people with ABI living in SSA. This study described the characteristics, support needs and participation of the group living in SSA and compared them with those of 61 people with ABI living in RAC. The study found that in Victoria, Australia, there were 128 people with ABI living in SSA with similar high-care needs to young people with ABI living in RAC. The people with ABI living in SSA went outside more often, participated more often in community-based leisure activities and visited friends and family more often than those living in RAC. This study concluded that the type of accommodation that people with an ABI reside in appears to have a significant impact on their level of community participation and interaction.

A number of studies have specifically examined accommodation outcomes for people with ABI who have high levels of challenging behaviour or dual diagnoses (Feeney, Ylvisaker, Rosen, & Greene, 2001; Kelly & Winkler, 2007; Ylvisaker, Feeney, & Capo, 2007). Through case study analysis, Kelly and Winkler (2007) discussed the accommodation and support outcomes for three individuals, which included prison, RAC and disability-specific SSA. They concluded that Australia requires more specialised long-term accommodation options, as well as additional community services for individuals with high levels of challenging behaviours arising from ABI. They proposed that this may result in better manage-

ment and the potential reduction or elimination of some challenging behaviours. It may also allow for the avoidance of inappropriate incarceration (Schofield et al., 2006).

These studies suggest a potential for disparity between the needs of the person and the accommodation and support environment. This incongruence can lead to a range of outcomes, such as poorly managed behaviours of concern, social isolation and decreased role participation, as well as overall reduced quality of life.

The Role of the Environment

Models of health and disability emphasise the importance of the physical, social, cultural, institutional and attitudinal environments and the influence they exert on participation, where participation is defined as involvement in a life situation (Kielhofner, 1985; World Health Organization, 2001). Each of these environmental influences may facilitate or impede participation. Wahl, Fange, Oswald, Gitlin and Iwarsson (2009) refer to this as *person-environment fit*. Kielhofner (1985) postulated that when an environment appropriately challenges a person's capacity they experience enhanced performance. However, when an environment demands performance below a person's capacity it can result in boredom and negative behaviour; and when environmental demands exceed a person's capacity it can elicit anxiety and feelings of hopelessness (Kielhofner, 1985). Therefore, dysfunction and decreased levels of participation may be the result of a mismatch between the person's needs and capacities and the environment (McCull et al., 1998). Modifying or changing an individual's environment may positively influence participation outcomes. Indeed, Willer and Corrigan (1994) argued that in many cases it is more effective to adapt the environment, than to attempt to change an individual.

A study by Whiteneck, Gerhart and Cusick (2004) aimed to explore the relationship between environment and participation for individuals living in a noninstitutional setting. They investigated barriers in the physical, social and institutional environments such as structural barriers, relationships with others living in the home and institutional policies. The authors found levels of participation to be significantly correlated with environmental barriers, where greater numbers of barriers were related to decreased levels of participation. The attitudes of other people at home or a lack of support and encouragement from them, as well as lack of someone else's help in the home, were barriers found to negatively influence participation.

The role of the environment in relation to a person's level of participation points to the importance of carefully tailoring models of accommodation and support for people with ABI. Given that each person has their own set of strengths and weaknesses, as well as values, life goals and accommodation history and preferences, it is necessary to consider a person's accommodation and support needs on an individualised basis. However, both clinical experience and previous research suggests that there may be limited options when considering accommodation and support models, such that individuals may end up living in a setting or having a support model that is inflexible to their changing needs over time, or impedes their wellbeing and level of participation (Winkler, Sloan, & Callaway, 2007a).

Accommodation and Support Transitions

Individuals with severe brain injuries who have high care and support needs may have less frequent accommodation changes (Thomsen, 1984). They may be restricted in the range of choices available and require much greater planning for transition (Winkler et al., 2007b). Despite these barriers, it is possible for some individuals to move to more independent living situations that provide greater opportunities for participation (Winkler et al., 2007a, 2007b). This may be achieved through assisting the individual to transition to a less restrictive accommodation setting, or by adapting the support within their current accommodation. These options reflect interventions based on 'a continuum of accommodation versus a continuum of support' (O'Brien, Pryor, Harman, Rivas, & Nicholl, 2010, p. 34)

Although research exists on the initial transition between hospital and home (McCabe et al., 2007; Turner et al., 2007, 2008), there is only limited research into subsequent accommodation transitions many years post brain injury. A single case description provided by McMillan and Herbert (2004) of an individual in a minimally conscious state, showed that improvements beginning as late as 5-years post-injury enabled the individual to move out of a nursing home with full support.

A number of group studies have achieved positive results in terms of enhanced accommodation and support outcomes by focusing on behavioural change as a necessary precursor for accommodation change. Residential neurobehavioural programs have resulted in more independent accommodation outcomes and reduction in support hours in selected groups of individuals (Eames, Cotter-

ill, Kneale, Storrar, & Yeomans, 1996; Wood, McCrea, Wood, & Merriman, 1999). In a screened sample, Eames et al. (1996) reported no significant difference in time since injury between those who benefited and those who did not benefit from specialist rehabilitation and suggested the individualised nature of timing for accommodation and support planning.

In contrast to residential programs that focus on behaviour, other studies have investigated residential programs focused on living skills and the potential these programs have to improve accommodation outcomes. In a study by Geurtsen, Martina, Van Heugten and Geurts (2008), the number of participants living independently with or without support increased from 41.6% pretreatment to over 70% at discharge and 1-year follow-up. There are also short-term residential programs in the community and slow-stream rehabilitation settings specifically designed for individuals who show potential for improvement in their independent living skills. Simpson and colleagues (2004) studied 50 individuals with a brain injury who resided at their transitional living program for an average of 7 weeks. Residents were admitted from inpatient brain injury rehabilitation services, acute rehabilitation centres and a brain injury rehabilitation unit community outreach service. Thirty per cent of residents were discharged to live independently in their own home, 60% to the family home, 6% to an aged care facility or other residential service and 4% to an acute hospital for elective surgery prior to discharge home. Improvements in psychosocial outcomes, adaptive functioning and independence levels were also observed.

An alternative model to residential programs is to place the individual in a least-restrictive, long-term living option and then arrange and grade the supports around them over time. As the person's skills develop or change, the support model can be adjusted as needed (O'Brien et al., 2010). A report of the Disability Service Commission of Western Australia (2008) outlined five models of community living illustrating such a continuum of support: living with live-in support, living with visiting support, living with neighbour support; living as a member of a neighbourhood network and living as part of a co-housing development. These models of supporting the person to remain in the same setting, but with adjusted levels of support according to need, promote quality of life and allow people to retain the social connections that develop within families, neighbourhoods and communities (O'Brien et al., 2010). Life-long rehabilitation can be coupled with models of housing and support to build on the functional gains that can still be made many years post-injury, with adjustment of support

over time as these gains are made (O'Brien et al., 2010).

Cost Benefit of Providing Services to Improve Accommodation and Support Outcomes

Health services and governments look not only at clinical outcomes, but increasingly consider the cost benefits of services. This is certainly true for long-term community supports for individuals with a brain injury. A New York study (Feeney et al., 2001; Ylvisaker et al., 2007) described how long-term, individualised and flexible community supports for individuals with challenging behaviour and dual diagnosis living in the community can result in maintaining these community living options and reduce overall service costs. The authors noted that although such services may result in an initial increase in input and cost, this is usually because the group are an underserved population who are at risk and these costs may be recovered over time (Feeney et al., 2001). It has also been shown that input can result in a positive change in living situation, with reduced care needs and subsequent overall savings (Ashley, Krych, & Lehr, 1990). While cost-effective, it is also of importance that these results correlate with improvements in participation and quality of life (Ashley et al., 1990) and are not always achieved at the expense of shifting the burden of care to families (Sloan et al., 2009a, 2009b).

Aims

This study aims to document and compare living situation outcomes of a group of individuals with severe ABI who received Community Approach to Participation (CAP) occupational therapy input over a 3-year period. It also aims to document the range of disability-specific and home-like accommodation models accessed by the group and seeks to examine whether there is a relationship between accommodation and support models and levels of independence, community integration and participation. Finally, the study aims to investigate transitions in accommodation and support models that occurred within the 3-year intervention period.

It was hypothesised that the type of accommodation setting within which a person resides would be related to the level of participation achieved and amount of paid and gratuitous support provided. That is, individuals living in home-like settings would have greater functional independence, community integration and role participation than those living in disability-specific accommodation. Support hours provided to people in the home-like

accommodation group were anticipated to be lower than those delivered to people living in disability-specific accommodation, although it was hypothesised that there would be a difference in the proportion of paid and gratuitous care between the two groups.

METHOD

Participants

Forty-five participants who received CAP intervention over the 3-year timeframe between January 2004 and January 2007 were recruited from two Victorian occupational therapy practices specialising in community rehabilitation for people with severe ABI. Some participants had received community rehabilitation input prior to January 2004, which is not reported on in the current study.

Individuals were generally referred to the practices for postacute community rehabilitation. Two individuals were excluded due to degenerative neurological conditions. Participants with challenging behaviour and co-morbidities including substance abuse or dual diagnoses were included in the study. These complexities are often present in this population and reflect a true representation of clients seen in the two practices. A sample of 43 individuals was identified, who all consented to intervention. Family members provided consent for those individual's unable to do so by reason of profound cognitive impairment.

The group of 43 participants have previously been reported on (Sloan et al., 2009a). At baseline, the mean age at injury was 28.42 years ($SD = 12.74$) and mean time post-injury was 6.73 years ($SD = 5.14$). Twenty-five (58%) of the participants were male and 18 (42%) were female. Sixty-seven per cent of the sample had sustained a traumatic brain injury, 21% had a hypoxic brain injury and 12% had experienced a cerebrovascular accident.

As presented in Table 1, participants lived in a range of age-appropriate community settings prior to their injury. This included living with family (53.5%) or with partner and/or dependents (20.9%).

There was a mix of compensable and non-compensable clients; 62% were funded by the Transport Accident Commission (Victoria's no-fault road accident compensation scheme), 20% were funded by the Victorian Acquired Brain Injury Slow To Recover Program (State Government of Victoria, 2006), 7% were funded through compensation controlled by a financial administrator, 3% were funded by the Victorian Workcover Authority, 5% were self-funded and 2% were funded by other sources, such as Disability Client Services in the Victorian Department of Human Services.

TABLE 1Living Situation at Pre-Injury, Baseline and at Each Time Point ($N = 43$)

Living situation	Pre-Injury	Baseline	T1	T2	T3
Home-like settings					
Home alone — no support	6 (14%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Home alone — with support	1 (2.3%)	3 (7%)	5 (11.6%)	5 (11.6%)	7 (16.3%)
Home with friends	2 (4.7%)	1 (2.3%)	1 (2.3%)	1 (2.3%)	1 (2.3%)
Home with partner and/or dependents	9 (20.9%)	8 (18.6%)	8 (18.6%)	9 (20.9%)	9 (20.9%)
Home with family	23 (53.5%)	15 (34.9%)	15 (34.9%)	14 (32.6%)	14 (32.6%)
Living with others in a separate area	0 (0%)	1 (2.3%)	0 (0%)	0 (0%)	0 (0%)
Australian Defence Force	2 (4.7%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Disability-specific settings					
Cluster unit	0 (0%)	0 (0%)	1 (2.3%)	1 (2.3%)	1 (2.3%)
Shared supported accommodation	0 (0%)	8 (18.7%)	9 (21%)	9 (21%)	7 (16.3%)
Residential aged care facility	0 (0%)	4 (9.3%)	2 (4.7%)	2 (4.7%)	3 (7%)
Locked neuropsychiatric unit	0 (0%)	3 (7%)	2 (4.7%)	2 (4.7%)	1 (2.3%)

Over 95.3% of participants were receiving at least one other type of therapy, in addition to CAP occupational therapy (OT), at some point during the intervention period. Many participants received three or more therapies. At some time during the 3-year intervention, 69.8% of the sample received physiotherapy, 48.8% received case management, 46.5% received psychology, 51.2% received speech therapy, 11.6% received recreation input and 11.6% received other therapies such as dietetics and vocational rehabilitation. However, there was considerable fluctuation in the frequency and length of other therapy input and its examination is beyond the scope of this study.

Of the 43 participants, 10 participants underwent one or more accommodation transitions within the 3-year intervention period and 33 participants remained in the same accommodation.

Measures

Living situation. Living situation was measured by categorising the participants' accommodation as either disability-specific or home-like accommodation setting at each of the four time points (baseline, T1, T2 and T3). Within this study, disability-specific accommodation categories included cluster units, disability SSA, RAC facilities and a locked neuropsychiatric unit (Winkler et al., 2007a). The support model of each of these settings provides 24-hour disability and/or nursing support. Support is typically provided on a shared basis, with varying staff to resident ratios. There may also be an allowance for a defined number of one-to-one support hours for selected activities, such as community access. In contrast, home-like settings are defined as accommodation accessed through

the private or public housing market (via either rental or purchase). In this study, home-like categories included living alone, with parents, friends, or a partner or living with others in a separate area of the house (e.g., a detached residence on the property). In these settings, disability support was not linked to the accommodation and thus, if support was required, it was sourced and structured separately from the housing.

Care and Needs Scale (CANS). The CANS was developed to capture the type of support a person requires following ABI and the duration of time an individual can be left alone (Tate, 2004). Individuals are categorised into one of five groups dependent on type of support and then a support level is assigned depending on the length of time an individual can be left alone. Support levels range from 0 (living independently in the community) to 7 (requires support, assistance, or supervision 24 hours per day). Although the CANS has remained an 8-category scale since its development, scoring of the levels has changed from 1 to 8 in 2004 (Tate, 2004) to 0 to 7 in 2007 (Soo et al., 2007), with the items remaining the same. In this study, the CANS Research Edition (Tate, 2004) was used with levels ranging from 1 to 8; however, the participants' scores were converted to comply with the 2007 revised edition (Soo et al., 2007).

Hours of care (paid and gratuitous). The total amount of care and support provided to each participant was recorded in hours per week, as suggested by Tate (2004). Total hours comprised both paid and gratuitous support (defined as unpaid assistance provided by family, friends or other community members). A breakdown of paid and gratuitous hours was also recorded separately. The

number of paid care hours was identified from the approval letters of funding bodies and cross-referenced with participants' support timetables. The number of gratuitous hours of support per week was determined via interview, occupational therapy progress notes and clinical knowledge of the client.

Functional independence, community integration, and role participation. The FIM™ (UDS Data Management Service, 1990), Community Integration Questionnaire (CIQ; Willer, Rosenthal, Kreutzer, Gordon, & Rempel, 1993), and Part One of the Role Checklist (RC; Oakley, Kielhofner, Barris, & Reichler, 1986) were used to measure functional independence, community integration and number of roles participated in (respectively). FIM™ scores range from 18 to 126, CIQ scores range from 0 to 29 and there are 11 possible life roles on the RC. On each measure, higher scores indicated greater levels of independence, community integration and life role participation. These measures have been discussed in more detail previously (Hall et al., 1996; Hough, 2001; Kielhofner, 1985; Willer, Ottenbacher, & Coad, 1994).

CAP occupational therapy hours. The number of CAP occupational therapy hours each participant received during the 3-year time frame was gathered from the practices' computerised accounting systems.

Transition factors checklist. A 24 item checklist describing factors that contribute to transition was developed by the authors. Items were categorised into five broad headings including discharge from time-limited service, client/family goals, availability and awareness of resources, improvements in client function and problems or issues in current accommodation/support options. It is a limitation that the Transition Factor Checklist is not a standardised measure. Following each transition the treating therapist indicated which of the listed items were critical for the participant's transition. The therapist could mark as many factors on the checklist that contributed, in terms of both precipitating and enabling the transition.

Procedure

Potential participants were identified in January 2005. Data for participants who had received CAP (Sloan et al., 2009b) occupational therapy intervention between January 2004 and January 2005 were collected retrospectively from client files and the treating clinician's knowledge of the individual and their program of activities and support. All other data were collected prospectively via assessment by the treating therapist. Data were collected

at four time points: January 2004 (Baseline), January 2005 (T1), January 2006 (T2), and January 2007 (T3).

Intervention

All participants received occupational therapy intervention that was delivered within the CAP model of community-based rehabilitation as previously described in detail by Sloan, Winkler, and Callaway (2004). The CAP is a community-based approach that aims to maximise an individual's level of participation in valued life roles. This is achieved through inclusion in home and community life, by maintaining or developing social relationships, facilitating engagement in meaningful occupation, undertaking targeted skill development and selecting appropriate accommodation environments. An earlier study of CAP intervention revealed increases in functional independence, community integration and role participation, and a decrease in care and support needs over a 3-year period (Sloan et al., 2009a). The CAP intervention was provided by seven occupational therapists, all of whom were trained in the CAP and received regular clinical supervision from the principal therapists who developed the approach.

Data Analysis

The score distributions of each variable at each time point were examined with a series of Kolmogorov-Smirnov tests and because a large number of variables were not normally distributed, nonparametric statistics were conducted. Mann-Whitney *U* tests were carried out to compare the disability-specific and home-like groups on all outcome measures. A series of repeated measures Friedman analyses of variance (ANOVA) were conducted. These investigated changes in outcome measures within groups over the 3-year period of intervention.

Data pertaining to the transitions of the subgroup of 10 individuals are presented descriptively, with one detailed case study. Statistical analyses were not feasible as there was considerable variability in the group that transitioned and, of those who moved, only three people transitioned from disability-specific to home-like accommodation and support models.

RESULTS

Accommodation and Support Models and Outcomes

Living situation. Pre-injury living situation, living situation at baseline and following one (T1),

TABLE 2

Demographic Data: Age at Injury, Injury Severity, and Time Post-Injury at Baseline for Each Subgroup

	Home-like Group		Disability-Specific Group		<i>p</i>
	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	
Age at injury (years)	28	21.67 (10.09)	12	25.67 (11.68)	.03
Length of PTA (days) ^a	21	111.29 (60.38)	3	140.00 (69.28)	<i>ns</i>
Time post-injury (days)	28	2653.29 (1886.40)	12	3550.33 (956.51)	<i>ns</i>

^aPTA not applicable for 14 participants. Missing PTA data for 4 participants with TBI.*ns* = not significant

two (T2) and three (T3) years of CAP occupational therapy intervention are outlined in Table 1. All participants were living in home-like settings prior to their injury. At baseline, when participants were an average of 6.73-years post-injury, approximately one third were living in disability-specific accommodation. At baseline and during the intervention period, no participants were living alone without any form of support.

Participants were grouped according to their accommodation setting in order to determine the differences in functional independence, community integration, role participation, care and support needs, care hours and occupational therapy hours. Three participants were excluded from these groups as they changed between home-like and disability-specific accommodation settings during the study. Given these exclusions, at baseline, 77% ($n = 28$) of participants were in home-like accommodation settings and 30% ($n = 12$) were in disability-specific accommodation settings.

The demographic details of the disability-specific and home-like groups are presented in Table 2. The home-like group were significantly younger at injury, but there were no significant differences in injury severity (as indicated by post-traumatic amnesia [PTA] length) or time post-injury. Male participants comprised 61% of the home-like group and 50% of the disability-specific accommodation group, a difference that was not significant.

There was a significant difference in the proportion of compensable participants in the home-like and disability-specific accommodation settings ($\chi^2(1) = 14.12, p < .001$). Within the home-like group 86% of participants had injuries that were compensable and only 25% of the disability-specific group had access to compensation.

Care and Support Needs

CANS levels for both groups over the four time points are presented in Tables 3 and 4.

Between-group comparisons. A Mann-Whitney *U* test indicated that the disability-specific accommodation group required a significantly higher level of support as measured by the CANS than the home-like group at baseline ($U = 77.50, z = -2.99, p = .003$); T1 ($U = 64.50, z = -3.19, p = .001$); T2 ($U = 59.50, z = -3.36, p = .001$); and T3 ($U = 55.50, z = -3.50, p < .001$).

Within group comparisons. Friedman's ANOVA indicated that there was no significant change in CANS level across the intervention period for the disability-specific group. There was a significant change across the intervention period for the home-like group, with a reduction in the scores over time indicating the ability to be left alone for longer periods.

Paid and Gratuitous Hours of Care

Between-group comparisons. A summary of paid and gratuitous care hours for both groups over the four time points is presented in Tables 3 and 4. A Mann-Whitney *U* test indicated that disability-specific group received significantly more total care hours than the home-like group at baseline, ($U = 83.50, z = -2.62, p = .009$), T1 ($U = 47.00, z = -3.67, p < .001$), T2 ($U = 46.00, z = -3.37, p < .001$) and T3 ($U = 46.00, z = -3.70, p < .001$).

Total care hours comprised hours of paid care and hours of gratuitous care, which were examined separately. The disability-specific group received significantly more paid care hours than the home-like group at baseline ($U = 22.00, z = -4.35, p < .001$), T1 ($U = 17.50, z = -4.48, p < .001$), T2 ($U = 11.00, z = -4.66, p < .001$) and T3 ($U = 10.00, z = -4.69, p < .001$).

In contrast, the home-like group received significantly more gratuitous care hours than the disability group at baseline ($U = 19.50, z = -4.48, p < .001$), T1 ($U = 32.50, z = -4.06, p < .001$), T2 ($U = 44.00, z = -3.73, p < .001$) and T3 ($U = 57.00, z = -3.39, p = .001$).

TABLE 3Summary of Outcomes for Home-Like ($n = 28$) Group

Time Point	M	SD	Median	Min	Max	IQR	Friedman's ANOVA
CANS (0–7)	Baseline	4.89	1.85	4	1	7	$\chi^2(3) = 16.15$, $p = .001$
	T1	4.54	1.18	4	1	7	
	T2	4.29	1.18	4	1	7	
	T3	4.29	1.84	4	1	7	
Paid care hours (per week)	Baseline	40.84	51.82	35.36	0	182	$\chi^2(3) = 4.75$, $p = .19$
	T1	35.31	45.05	16.50	0	176	
	T2	31.62	40.60	14.5	0	172.5	
	T3	32.88	42.19	14	0	172.5	
Gratuitous care hours (per week)	Baseline	50.62	48.39	28	0	130	$\chi^2(3) = 16.16$, $p = .001$
	T1	51.20	51.47	21	0	156	
	T2	42.27	45.88	14.50	0	126	
	T3	38.09	47.31	14	0	134	
FIM TM score (18–126)	Baseline	95.61	28.81	105.50	18	124	$\chi^2(3) = 8.90$, $p = .03$
	T1	97.71	29.11	107.50	18	125	
	T2	98	28.91	108.50	18	124	
	T3	99.07	28.05	108.50	18	126	
CIQ score (0–29)	Baseline	9.37	3.92	9.38	0.00	17.25	$\chi^2(3) = 33.33$, $p < .001$
	T1	12.16	4.54	12.63	0.00	19.25	
	T2	13.69	4.56	14.25	1	20.75	
	T3	14.15	5.20	13.75	1	23	
RC score (0–11)	Baseline	3.32	1.36	3.00	1.00	6.00	$\chi^2(3) = 26.11$ $p < .001$
	T1	4.14	1.78	5.00	0.00	6.00	
	T2	4.46	1.67	5.00	1.00	7.00	
	T3	4.82	1.36	5.00	1.00	7.00	

IQR = Interquartile Range

FIMTM = Functional Independence Measure

CIQ = Community Integration Measure

RC = Role Checklist

Within-group comparisons. Total care hours for the disability-specific group increased by 2.25 hours per week over 3 years, which was not significant. Separate Friedman's ANOVA indicated that there was no significant change in paid care or gratuitous care hours across the intervention period for the disability-specific group.

There was a significant decline in total care hours for the home-like group over the 3 years of intervention, with an average decrease of 20.49 hours per week. This was comprised of a reduction of 12.53 hours of gratuitous care and 7.96 hours of paid care. Separate Friedman's ANOVA indicated the reduction was significant for gratuitous care hours but not paid care hours.

Functional Independence, Community Integration, and Role Participation

Between-group comparisons. Tables 3 and 4 present the results for the home-like and disability-specific accommodation groups on the three measures of independence, community integration and role participation. Mann-Whitney U tests indicated that there was a statistically significant difference on FIMTM scores between the home-like and disability-specific groups at baseline ($U = 78.50$, $z = -2.64$, $p = .008$), T1 ($U = 71.00$, $z = -2.87$, $p = .004$), T2 ($U = 74.00$, $z = -2.78$, $p = .006$), T3 ($U = 60.00$, $z = -3.19$, $p = .001$) with the disability-specific group experiencing lower

TABLE 4Summary of Outcomes for Disability-Specific ($n = 12$) Group

Outcome measure	Time Point	<i>M</i>	<i>SD</i>	Median	Min	Max	IQR	Friedman's ANOVA
CANS (0–7)	Baseline	6.75	0.87	7	4	7	0	$\chi^2(3) = 3.00$, $p = .39$
	T1	6.50	1.00	7	4	7	1	
	T2	6.5	1.00	7	4	7	1	
	T3	6.67	.89	7	4	7	0	
Paid care hours (per week)	Baseline	170.33	10.12	168	162	202	0	$\chi^2(3) = 4.39$, $p = .22$
	T1	169	11.43	168	152	202	0	
	T2	169.67	13.56	168	152	210	0	
	T3	171.08	13.97	168	152	210	0	
Gratuitous care hours (per week)	Baseline	.5	1.73	0	0	6	0	$\chi^2(3) = 3.60$, $p = .31$
	T1	2.08	4.77	0	0	16	2.25	
	T2	2.08	4.76	0	0	16	2.25	
	T3	2.00	4.97	0	0	16	0	
FIM TM score (18–126)	Baseline	67.33	33.94	74	18	109	68	$\chi^2(3) = 6.76$, $p = .08$
	T1	71.50	34.38	85	18	111	69	
	T2	71.08	34.09	85	18	111	65	
	T3	70.00	33.38	83.5	18	110	65	
CIQ score (0–29)	Baseline	4.54	3.26	4.50	1.00	10.50	0	$\chi^2(3) = 17.51$, $p = .001$
	T1	7.35	3.50	8.00	1.00	11.50	5.81	
	T2	7.63	3.75	7.13	1	13	6.13	
	T3	7.01	4.94	6.00	1.00	17.00	5.17	
RC score (0–11)	Baseline	2.42	2.39	2.50	0.00	7.00	4.00	$\chi^2(3) = 10.27$, $p = .02$
	T1	3.67	2.23	4.00	0.00	7.00	5.00	
	T2	3.42	2.35	4.50	0.00	7.00	4.00	
	T3	4.17	1.80	4.50	1.00	6.00	4.00	

IQR = Interquartile Range

FIMTM = Functional Independence Measure

CIQ = Community Integration Measure

RC = Role Checklist

independence levels as measured by the FIMTM. On the CIQ, there was a statistically significant difference between the home-like and disability-specific groups at baseline, ($U = 60.00$, $z = -3.20$, $p = .001$), T1 ($U = 60.50$, $z = -3.18$, $p = .001$), T2 ($U = 48.50$, $z = -3.53$, $p < .001$) and T3 ($U = 51.50$, $z = -3.44$, $p = .001$). Again, the disability-specific group experienced lower integration levels than the home-like group. Mann-Whitney U tests indicated that there no statistically significant differences in the number of life roles between the home-like and disability-specific groups at all time points.

Within-group comparisons. For the disability-specific group, Friedman's ANOVA showed no significant change in FIMTM scores over 3 years. There was a significant increase in total CIQ scores and number of life roles on the RC. The number of life roles in which participants in disability-specific accommodation engaged increased by an average of 1.75 roles by the end of the intervention period.

Within the home-like accommodation group, there were significant changes over the 3 years on the FIMTM, CIQ and number of life roles on the RC. The number of life roles in which participants in home-like accommodation engaged increased

TABLE 5

Demographic Data for Age at Injury, Injury Severity, and Time Post-Injury at Baseline for Transition and Nontransition Group

	Transition Group		Non-transition Group		<i>p</i>
	<i>n</i>	<i>M (SD)</i>	<i>n</i>	<i>M (SD)</i>	
Age at injury (years)	10	29.80 (14.69)	33	21.45 (9.61)	ns
Length of PTA (days) ^a	5	125.00 (70.18)	20	115.60 (60.13)	ns
Time post injury (days)	10	3162.00 (1922.41)	33	2555.75 (1828.86)	ns

^aPTA not applicable for 14 participants. Missing PTA data for 4 participants with TBI.

ns = not significant

by an average of 1.5 roles by the end of the intervention period.

Occupational Therapy Hours

A Mann-Whitney *U* test indicated no significant differences in total CAP occupational therapy hours between the disability-specific and home-like groups. The disability-specific group received mean total of 113.42 (*SD* = 98.12, *MD* = 81.87, *n* = 12) hours of CAP occupational therapy over the 3-year intervention period compared with a mean total of 165.79 (*SD* = 131.76, *MD* = 136.00, *n* = 28) for the group living in home-like accommodation.

Transitions

Ten participants experienced a total of 12 accommodation transitions over the 3-year intervention period. The demographic details of the transition and nontransition groups are presented in Table 5. There were no significant differences in the proportion of males in the transition group (40%) and nontransition group (63.60%), nor were there significant differences in the proportion of compensable participants in the transition group (66.70%) and nontransition group (60%). It is, however, important to note that the four noncompensable participants in the transition group were all in receipt of funding under the Victorian Acquired Brain Injury Slow to Recover program, thus had access to ABI-specific allied health services and some weekly attendant care support comparative to some compensable participants. Demographic details of each of the 10 participants who transitioned are provided in Table 6.

Outcome measures for transition participants.

Table 7 provides details of the living situation, total care hours per week, FIM and CIQ scores, number of life roles and CANS level for each of the 10 participants at baseline and at each time point over the 3-year intervention period.

Between baseline and T1 five participants changed accommodation settings. Between T1 and T2 four participants changed accommodation setting and between T2 and T3 three participants changed accommodation setting. Three people transitioned across types; that is disability-specific to home-like settings (participants AA, BB and CC). While two of these individuals still required 24-hour care, the model of support changed considerably. Participant AA underwent two transitions in the intervention period, the second of which was from a disability-specific to a home-like setting when he moved from SSA to living alone in a rental property with 42 hours per week of one-to-one support. Participant AA's transitions are further detailed in a case study below. Participant BB moved from a disability-specific shared supported model of support to 24-hour one-to-one care in his own home. Participant CC went from RAC, with a considerable number of additional gratuitous hours layered on top of this to supplement the perceived deficiencies in the RAC model (as is common for the families of younger people in RAC to provide) (Winkler et al., 2007b), to living at home with family with 48 hours of one-to-one paid attendant care support/week and the rest of the 24-hour daily care provided gratuitously by family. Seven participants transitioned within the same type of accommodation (i.e., disability-specific or home-like), but to less restrictive options. Four participants purchased their own homes, three of whom had a preceding 12-month trial in rental accommodation.

Two participants transitioned twice during the 3-year period, Participant GG and Participant AA. Participant GG moved from living in a transportable separate residence on her parent's property, to living alone with support in rental accommodation, to purchasing her own property onto which she moved her transportable separate residence and where she lived alone with visiting support. Participant AA's transitions from RAC to disability-specific SSA and then to living alone

TABLE 6
Demographic Details for Subgroup Who Transitioned ($n = 10$)

	Age (at baseline)	Years since injury	Aetiology of ABI	Compensable (Yes/No)	PTA length (days)
AA	49	1.3	CVA	No	
BB	49	1.5	TBI	Yes	180
CC	21	1.9	Hypoxia	No	
DD	52	3	Hypoxia	No	
EE	41	2.5	CVA	No	
FF	54	20.6	CVA	Yes	
GG	34	19	TBI	Yes	180
HH	50	4.7	TBI	Yes	165
II	36	11.3	TBI	Yes	30
JJ	28	12.7	TBI	Yes	70

CVA = Cerebrovascular Accident

with visiting support are described in a case study below.

Occupational therapy hours. The group who did not transition received a mean total of 141.02 ($SD = 111.79$, $MD = 116.25$, $n = 33$) hours of CAP occupational therapy during the 3-year intervention period compared with a mean total of 225.52 ($SD = 158.13$, $MD = 191.00$, $n = 10$) hours for those who did transition. Clinically, this appears to be a large difference but a Mann-Whitney U test indicated no significant differences in total CAP occupational therapy hours between the two groups over the three years of intervention.

Factors impacting on transition. Results from the Transition Factor Checklist for the 12 transitions undertaken by the 10 participants are shown in Table 8. For each transition an average of 8.41 ($SD = 1.73$, Range 5–11) factors were identified as being crucial, out of the possible 24 factors. Fifty-eight per cent of transitions were prompted by at least one identified problem in the individual's current accommodation and support option, such as dislike of living with co-residents, although in no case was the person's situation in crisis. In all situations, client and/or family objectives were identified as vital, with goals for age-appropriate options that provided greater independence and choice predominant. This was coupled with 100% endorsement of at least one item related to the availability of resources, including having an alternate accommodation option, as well as funding to both facilitate the transition and providing an adequate level of ongoing support in the new setting. Improvements in participants' function, particularly everyday livings skills and cognitive-behavioural function, were identified as crucial in 92% of tran-

sitions, with skill development enabling 58% of transitions and willingness to take risks also being important in half the cases. Interestingly, improvements in physical function were not seen as crucial in any of the transitions.

Case Study: Participant AA

AA had a left middle cerebral artery cerebrovascular accident at the age of 48 years (Table 6). Prior to his ABI, AA lived alone without any support. As a result of the injury sustained, AA had a severe expressive language impairment, cognitive impairment, dense left hemiplegia and hemianopia. During his inpatient hospital admission, AA was registered on the Victorian Department of Human Services' Disability Support Register as requiring accommodation and support. He was subsequently discharged from the inpatient setting to an RAC facility due to his need for 24-hour care and lack of other age-appropriate options being available at that time. AA was accepted to the Acquired Brain Injury Slow to Recover program soon after his discharge and commenced receiving ABI case management, allied health intervention (occupational therapy, physiotherapy and speech pathology) and attendant care support within the RAC. At baseline, 1.3 years post injury, AA's scores demonstrated reduced functional independence and community integration, with his role participation being limited to that of a family member (Table 7). Thus, AA was rated as level 7 on the CANS, indicating that he was unable to be left alone, requiring 24-hour supervision or assistance. Between baseline and T1, AA received a total of 100.5 hours of occupational therapy in addition to receiving 15 hours per week of one-to-one attendant care support, all of which was funded by the Acquired Brain Injury Slow to Recover Program. The CAP occupational

TABLE 7Accommodation and Support Model, Total Care Hours, FIM, CIQ, Roles and CANS over the 3-Year Period of Intervention for the Participants Who Transitioned ($n = 10$)

	Accommodation & Support Model	Total care hours	FIM	CIQ	Roles	CANS
AA						
BL	RAC/nursing home	168	71	4	1	7
T1	Group Home	168	82	8	1	4
T2	Group Home	168	88	9.25	3	4
T3	Home alone — with support	42	81	12	4	4
BB						
BL	Supported accommodation	168	37	5	3	7
T1	Supported accommodation	168	37	8.5	4	7
T2	Supported accommodation	168	37	8.5	4	7
T3	Home alone — with support	168	38	9	4	7
CC						
BL	RAC/nursing home	168	31	1	2	7
T1	Home with family	168	49	3	2	7
T2	Home with family	168	58	10	4	7
T3	Home with family	168	81	9	6	7
DD						
BL	Locked Neuropsychiatric Unit	168	82	2	0	7
T1	Cluster Unit	168	96	3	4	6
T2	Cluster Unit	168	87	11	3	6
T3	Cluster Unit	168	93	8	4	6
EE						
BL	Locked Neuropsychiatric Unit	168	21	1	0	7
T1	Locked Neuropsychiatric Unit	168	22	4	2	7
T2	Locked Neuropsychiatric Unit	168	20	5	1	7
T3	RAC/nursing home	168	22	3	2	7
FF						
BL	Home alone — with support (rental)	6	94	5.25	1	3
T1	Home alone — with support (rental)	6	100	5.25	1	3
T2	Home alone — with support (home owner)	6	93	3.5	1	3
T3	Home alone — with support (home owner)	6	93	4	3	3
GG						
BL	Living with others in a separate area	49	106	5.25	2	4
T1	Home alone — with support (rental)	49	107	12	5	4
T2	Home alone — with support (home owner)	49	104	15.5	3	3
T3	Home alone — with support (home owner)	55	109	19	5	3
HH						
BL	Home alone — with support (rental)	168	42	9.25	4	7
T1	Home alone — with support (rental)	168	27	4	0	7
T2	Home alone — with support (home owner)	168	25	8.25	2	7
T3	Home alone — with support (home owner)	168	32	8	3	7

therapy input focused on skill development in personal care activities such as bathing, dressing and grooming, equipment prescription (e.g., motorised wheelchair), developing money handling

skills and accessing facility and community-based leisure activities.

Through targeted exploration and advocacy by the ABI case manager and CAP OT, a vacancy in

TABLE 7

Continued

	Accommodation & Support Model	Total care hours	FIM	CIQ	Roles	CANS
II						
BL	Home with family	33	120	17.25	4	4
T1	Home with family	21	120	18.25	5	3
T2	Home with partner and/or dependents	14	118	20.75	6	3
T3	Home with partner and/or dependents	0	117	22	7	2
JJ						
BL	Home with family	28	120	12.25	5	3
T1	Home alone — with support (home owner)	14	120	19.25	6	3
T2	Home alone — with support (home owner)	12	120	19.25	6	3
T3	Home alone — with support (home owner)	12	113	22	6	2

BL = Baseline

a disability-specific SSA was identified and AA chose to move from RAC to this shared accommodation during the first year of intervention (i.e., between baseline and T1). At T1, he had increased his functional independence, social integration and productivity. However, he continued to have no involvement in home integration tasks, such as meal preparation, and he still participated in only one life role. AA's level of support need also reduced between Baseline and T1. At T1 he was rated as Level 4 on the CANS, indicating that he was able to be left alone for part of the day and overnight. However, it should be noted that in the disability-specific SSA AA was not left home alone due to a 24-hour staffing model. So, his actual hours of support did not reduce, although the gains opened up the range of community accommodation options available to him in the future.

After several months, AA reported that he did not like this SSA option due to the need to live with other people with disabilities. As a result, while living at this accommodation he spent much of his free time in his room watching television. AA's attendant care program continued in the SSA and included a therapist-guided structured rehabilitation program involving snack preparation, community mobility and road safety, as well as participation in an ABI-specific, community-based leisure group. Between T1 and T2, AA received a total 81.75 hours of CAP occupational therapy and 16 hours per week of attendant care support. Following this input, at T2 (refer to Table 7), AA's FIM score had further increased, as had his score on the CIQ. Of note, he commenced participation in some home integration tasks, specifically meal preparation. AA's role participation had increased to three roles, which were family member, home maintainer and hobbyist. He remained at Level 4 on the CANS.

During the third year of intervention, AA was supported to investigate and pursue alternatives to the shared supported accommodation. He subsequently transitioned a second time (between T2 and T3) from the disability-specific SSA to living alone in a rental unit with some one-to-one attendant care support. Between T2 and T3, AA received 138.5 hours of CAP occupational therapy. This additional occupational therapy input focused on further skill development in activities of daily living, sourcing additional equipment, reviewing and changing the structure of the attendant care program, providing written guidelines for, and education and training to, disability support workers. Occupational therapy intervention also included assisting AA to develop a routine in his new environment, revising AA's weekly budget to suit his new living arrangements, commencing participation in grocery shopping and implementing cognitive strategies to assist AA to initiate other community activities independently. When his accommodation changed, AA's paid care hours decreased by 126 hours per week, from 168 hours (which was a mix of shared and one-to-one support) to 42 hours of one-to-one support per week. The 42 hours comprised morning and evening input from disability support workers for assistance with personal care, medication, gait training, laundry tasks, meal preparation and grocery shopping. AA did not receive any hours of gratuitous care. In his new environment, AA was noted to initiate more activities including going out independently into the community to the local shops. AA also began writing to his family overseas with assistance from a disability support worker. At the end of the 3-year period, he reported being happy in his living environment and he was participating in four life roles. He continued to reside in this model of home-like accommodation three years later.

TABLE 8

Factors Identified by Treating Therapists as Critical to 12 Transitions Undertaken by 10 Participants

Factor	Percentage of transitions where factor endorsed
Discharge from time-limited service	16.7
Problems and issues in current accommodation and support option	58.3
Accommodation breakdown/crisis	0
Dissatisfaction with current support provider(s)	33.3
Inadequate level of current support	16.7
Dissatisfaction with current co-residents	25.0
Geographical location of current accommodation	8.3
Family breakdown/burnout	8.3
Deterioration in behaviour/increased distress	16.7
Loss of physical function/skills	0
Client / family goals for	100.00
Greater independence	83.3
Greater choice and control	75.0
Enhanced quality of life	8.0
Age-appropriate option e.g., life cycle stage	75.0
Transition from living with parents	25.0
Home ownership	41.7
Availability/awareness of resources	100.0
Advocacy	8.33
Vacancy in a disability-specific setting	33.3
Support to facilitate the transition	83.3
Adequate ongoing paid support	91.7
Ongoing family support	41.67
Improvements in clients function	91.7
Increased skills in everyday tasks	58.3
Improved cognitive-behavioural function	41.7
Improved physical skills	0
Willingness to manage risks	50.0

Discussion

The current study was undertaken to explore the range of accommodation options accessed by people with severe ABI returning to community living and investigate the differences in participation outcomes for those living in home-like models and those in disability-specific settings. It also examined accommodation transitions for those participants whose model of accommodation and support changed within the intervention period and factors critical to this change. This study found that individuals with high care and support needs, particularly those with noncompensable injuries, may be unable to return to their pre-injury living situation or access home-like settings. Those able to return to a home-like setting did so with the addition of a structured support model, typically comprising gratuitous support of family and

other community members, as well as paid care. For those unable to live in home-like settings, a small range of disability-specific accommodation and support options were available.

The findings confirmed the hypothesis that the type of accommodation setting was related to the amount of support provided, with statistically higher levels of support provided to those in disability-specific settings. However, this finding may also point to the limited flexibility within disability-specific accommodation to tailor and grade supports over time to meet the range of individual needs within community living, when compared with home-like settings. Across both groups there was significant variability in individual needs, but, based on the CANS, the current study suggests that people living in disability-specific accommodation settings had a higher

mean level of support need at baseline than those in home-like settings. The FIM™ scores indicated that, overall, the disability-specific group required greater levels of physical support in basic activities of daily living than the participants living in home-like settings. However, many of the individuals living in home-like settings had similarly high support needs. Again, this finding may point to the limited flexibility to grade or reduce support within disability-specific settings as skills develop and the person achieves a greater level of daily independence, when compared with home-like settings.

The individual's accommodation and support model provides a critical context to the daily activities, routines and roles in which he or she participates. The findings confirmed the hypothesis that accommodation type would be related to levels of independence and community integration with participants living in home-like settings displaying higher scores on the FIM™ and CIQ at all time points. However, there were no differences in role participation, and participants in both types of living situations were able to increase their role participation over the three years of intervention. As has been previously reported (Sloan et al., 2009a, 2009b), occupational therapy intervention that specifically targets role participation can be successful irrespective of levels of disability or time post-injury.

Over the 3-year period of the intervention the people in the home-like settings experienced small gains in independence as measured by the FIM™, while there was no change on this measure for the disability-specific group. While it is possible that people in disability-specific settings had less potential for improvement, it is more likely that the support model itself does not promote gains in independence to the same extent as support delivered in home-like settings. Support workers within shared models of care may not have the time to allow people to take longer to perform tasks while they are learning skills and instead may provide more assistance than the person may need for the sake of efficiency and to ensure there is time to meet all residents' needs. For instance, if two people are rostered to provide support to five residents to complete morning personal care tasks, there will likely be little scope to take extra time with the one resident who desires greater independence. In the absence of support to target skill development for increased independence, there is less possibility in the longer term for building on small gains to eventually reduce the individual's support hours. Further, the care model within disability-specific settings is fixed to the needs of the group, typically via a model of block funding or a daily bed fee, so there is less scope to adapt support hours to the

changing needs of a specific individual. Consistent with these observations, the current study found that support hours for the disability-specific group did not reduce over the 3 years of intervention. In contrast, for those in home-like settings, there was a statistically significant mean reduction of 20.48 hours support hours per week by the end of the 3-year study.

For those people returning to, or living in, home-like settings, the typically high level of gratuitous care provided to sustain this model of support was apparent. Given this finding, consideration must be made to supporting family networks and managing caregiver burden in order to ensure sustainability of gratuitous support over the long term. Existing research studies in the field of ABI point to a relationship between family or caregiver burden and a range of negative psychosocial outcomes for caregivers, including increased anxiety and depression (Douglas & Spellacy, 2000; Hibbard et al., 2002; Marsh, Kersel, Havill, & Sleight, 1998; Ponsford, Olver, Ponsford, & Nelms, 2003; Rivera, Elliott, Berry, & Grant, 2008), social isolation (Douglas & Spellacy, 2000), decreased coping ability (Chronister & Chan, 2006; Hibbard et al., 2002; Turner et al., 2007), increased family dysfunction or distress (Winstanley, Simpson, Tate, & Myles, 2006), decreased participation in work and leisure activities (Dixon, Walker, & Salek, 2006), increased financial burden (Turner et al., 2007), and decreased satisfaction and quality of life (Chronister & Chan, 2006). However, importantly, Winstanley and colleagues (2006) found that family functioning and distress in relatives could not be predicted directly from the severity of residual neurobehavioural impairment. Rather, psychological distress was mediated by the degree of community participation achieved by their relative with brain injury, where participation comprised both occupational activities and independent living skills. The authors pointed to the need for increased community resources and a stronger rehabilitative emphasis on participation in order to promote family functioning.

The CAP provides a direction for such rehabilitation, and is delivered within contextualised home and community environments relevant to the person with ABI and their primary support network (Sloan et al., 2004, 2009a, 2009b). This contextualised approach allows for assessment of a person's changing skills and support needs over time and provides a framework for the gradual reduction in gratuitous support hours, which was statistically significant over the 3-year period of the current study. However, despite this reduction, the study highlighted that, by the end of the 3-year period when participants in home-like settings were

over 10-years post injury, they were still receiving an average number of hours of gratuitous support equivalent to a full-time job for carers delivering support. Further exploration of the role of family is required to articulate the nature of the tasks they undertake and to identify the ways they can be supported to sustain this high level of input and moderate the experience of carer burden.

While an individual lives in a disability-specific supported accommodation setting, where support is fixed to the needs of the group via a model of block funding or daily bed fee, it can be difficult to ascertain what the person's actual support needs are. Clinical experience suggests that, for this to be determined, the individual may need to be placed in a different environment where the support can be reconfigured in terms of hours (e.g., opportunities for time alone), intensity (e.g., distant supervision to replace hands-on or one-to-one support), or type (e.g., support of a taxi driver to replace attendant care) to assess their skills and actual needs. Transitional accommodation facilities can provide such settings and, as previously noted, there is research to suggest the potential for reductions in ongoing support needs following such admissions (Eames, Cotterill, Kneale, Storrar, & Yeomans, 1996). Alternatively, to develop skills in shared supported settings it may be necessary to provide additional one-to-one input in-situ to facilitate skill development (as occurred with AA). While there may be little capacity to adjust the support model in disability-specific shared supported housing to reflect any gains in independence, these achievements may act as stepping stones in facilitating transition to less restrictive or less intensively supported and perhaps more home-like, settings. In this way improved independence and participation can drive the change to a less restrictive accommodation and support model.

The reasons for the 12 transitions undertaken by participants during the 3-year period were varied, but broadly fell into two categories. Some factors related to a participant's goal or a need to move and other factors were necessary to enable the transition to occur. For most individuals, the aim of an accommodation transition was to move to a more independent or less restrictive living environment. Age-appropriate life stage changes (e.g., a desire for separation by the adult child from living with parents), the goal of home ownership, and, for older participants, reduced appeal of shared living prompted a number of transitions. Most participants desired increased independence and greater choice and control over their life, which could be achieved through more flexible support models associated with home-like settings. A mean of over eight factors per transition was identified and

points to the complexity and range of issues that require consideration by the individual, family and therapy team. Clinically, the trigger to commence transition planning might be, for instance, an expressed goal of the client, but a range of other elements such as funding, skill development and identification of alternate suitable options will be required before the transition can occur. Interestingly, about half of the transitions required a willingness to take risks, which was particularly apparent when participants were placed in home-like settings where they would be required to spend time alone. Often in these situations additional support was provided initially and then reduced as the person's skill level and the degree of confidence in their capacity to safely manage time alone increased. However, some dignity of risk still remained.

For those who did transition during the intervention period, the number of CAP occupational therapy hours used, particularly in the year of transition, was an indicator of the high level of support and careful preparation required to facilitate a successful accommodation and support model change. The 10 participants that changed accommodation had on average 84 more hours of CAP occupational therapy over the 3-year period than those who remained in the same accommodation. Many of these additional hours were expended in the year of transition to support the individual to achieve community living goals and to structure new supports matched to the skills of the individual and the model of accommodation into which the person was transitioning. The CAP occupational therapy hours were used for the following types of interventions: developing daily routines within the new home and local community environments, transferring existing routines from the old to the new setting, writing guidelines for disability support workers and providing training, undertaking targeted living skill development, considering and adapting the physical and cognitive environment to reduce the impact of impairments, sourcing personally meaningful activities within the new local neighbourhood and establishing routines to increase participation in these activities and developing structured support timetables and models, including which activities the person can do for themselves and those they need to be supported to do. Transition is therefore seen as an individualised process that often occurs over a more extended timeframe.

In the absence of such transitional support, it is possible that people remain in environments that, over time, become mismatched to their support needs. If this is coupled with a dislike of living in that setting (as occurred with AA) psychological

distress can feed an increase in challenging behaviours. These situations can escalate, as had occurred for the two individuals (DD and EE, see Table 6) who were living in a secure neuropsychiatric facility at baseline. These individuals' previous placements in disability-specific SSA broke down as a result of a support needs mismatch, which eventually snowballed into high frequency of behaviours of concern, in addition to mental health issues. While the secure neuropsychiatric setting allowed for these individuals to be safely and expertly managed from a neuropsychiatric perspective, it is a restrictive environment and neither individual was participating in even one life role during their admissions (Table 7).

These issues also have implications for government and funding bodies and the long-term costs of care. Failure to support individuals to maximise their potential for independence and to transition to less intensively supported settings over a lifetime can result in higher long-term costs. Further, accommodation breakdown or the onset of secondary impairments such as neuropsychiatric issues resulting from a mismatch between the individual and their living environment can be extremely costly to remedy. The relationship between accommodation outcome and funding was apparent in that over 85% of participants in home like-settings, but only 25% of those in disability specific-settings had compensable injuries. With adequate funding for ongoing paid support identified as a critical factor in 92% of transitions, it is clear that transitions to less restrictive and more home-like settings are generally not possible without adequate levels of ongoing funding. For those people without access to compensation for their injury, the current disability support system is underfunded and offers restricted choice, with no certainty of access to the appropriate supports necessary for community living (Productivity Commission, 2011).

Participation, behaviour and function may be improved by matching the individual with the most appropriate accommodation and support model and ensuring this model can be flexible and responsive to changing needs over time. This is particularly the case when this change is underpinned by client-driven goals and choices. In contrast to many disability-specific settings, home-like environments are familiar and contain customary cues that can trigger more adaptive behaviours and everyday actions, particularly if these are also naturally role-modelled by other members of the household. Further, as the support model can be tailored and adjusted to the person's actual needs in an individualised manner, and then modified over time, it offers greater scope for building on gains in independence. As noted by O'Brien et al. (2010), this

model, referred to as *continuum of support*, enables the individual to remain in a location of their choice and retain existing social networks, while continuing to receive the type and level of support that matches their changing needs.

In a disability-specific setting the support model is predetermined, so therapists and family members have to try and select a model that matches the person's disability and support needs. Given the limited models and vacancies typically available in disability housing, compromises are usually made and challenges are often posed (e.g., in regard to co-resident compatibility or geographical location of the vacancy in relation to existing social networks or community links of the individual). Following admission, there may be limited capacity to adjust the support model or social environment to the person.

Given the variability in people's needs and preferences, it is important that there are a range of flexible and responsive disability-specific accommodation and support models to choose from. Further, people's needs should be reviewed over time or as circumstances change. Opportunities to transition to alternative settings, or to have the support model adjusted, should be available. Australian disability policy is in a time of change, with a call for individualised, flexible and lifetime support of people who acquire disabilities through a National Disability Insurance Scheme (NDIS) (Commonwealth of Australia, 2009a). The NDIS will address the inequity in the current system and provide the resources required for people with severe brain injuries to have greater choice regarding accommodation and support.

Additionally, an expanded range of disability-specific supported housing options is an anticipated outcome of the Supported Accommodation Innovation Fund (SAIF) (Australian Government, n.d.). This initiative states a preference for separation of accommodation from the support provider and although this separation has been a known best practice principle for more than a decade, there are very few examples of its implementation in circumstances where a person requires 24-hour support. This is a current limitation in the service sector as disability-specific housing models tend to be quite homogenous, with the choice being largely between community-based SSA or more institutional facilities such as RAC. In addition, for people who require disability-specific care, SSA is predominantly block-funded. This means a single organisation provides both housing and daily support. The variety or scale of supported accommodation options required to meet the range of individual needs and lifestyles of people with ABI is therefore currently limited. This restricted range of

options and block-funding of services demonstrates the disconnection between the disability policy aspirations and the lived experience of people with ABI and other disabilities (Commonwealth of Australia, 2009b; Pearson, 2008) and adversely affects capacity for, and choice of, accommodation and support transitions over a person's lifetime.

In summary, this study found that, at an average of 6.73 years post-injury, people with severe ABI were living in a range of disability-specific and home-like accommodation and support settings. Both groups significantly increased their number of life roles over a 3-year period, pointing to the importance of lifetime support including ongoing intervention to help rebuild levels of participation following ABI. Participants in home-like settings also increased their level of independence and community integration and their total number of support hours reduced by 20.48 per week. Support hours were static for those living in disability-specific accommodation and support options. Ten of the 43 participants transitioned during the 3-year period, three of whom transitioned from disability-specific to more home-like settings. These findings need to be treated with some caution in that data was collected on a small number of participants and by their treating therapists. These results, however, highlight the dynamic nature of accommodation and support for individuals with severe ABI. They also point to the restricted range of supported accommodation models available at this time and the necessity for often significant levels of gratuitous support for the person with ABI to live in home-like environments. Accommodation innovation is required to deliver a greater range of integrated housing and support models to more closely match the range of preferences and needs of individuals, coupled with research into the outcomes of these models on independence, participation and family burden of care. Further, there should be targeted intervention to maximise independence and participation and opportunities to flexibly modify support structures over the course of a person's lifetime. For some individuals, this will translate into a reduction in the long-term costs of care.

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