

Development and effectiveness of an integrated inpatient and community service for challenging behaviour in late life: From Confused and Disturbed Elderly to Transitional Behavioural Assessment and Intervention Service

Dementia

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Abstract

A common method of managing challenging behaviour associated with dementia is long-stay special care units, though models are very diverse. In New South Wales, Australia, the five remaining state-run long-stay special care units for this population were funded to adopt a shorter-term model which had been trialled by one of the units. Transitional Behavioural Assessment and Intervention Service Units, incorporating an integrated outreach team, were to provide multi-disciplinary assessments, develop individualised bio-psychosocial management plans for, and appropriately discharge people with significant levels of Behavioural and

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Psychological Symptoms in Dementia. The current study assessed both the effects of the change and the clinical effectiveness of the model.

Method: A repeated measures design, supplemented by multiple one-time measures. A range of standard instruments were administered, patient data from other types of inpatient units were obtained, interviews conducted, and medical records examined.

Results: Transitional Behaviour Assessment and Intervention Service units were admitting patients with dementia and a variety of significant challenging behaviours. Length of stay was shortened in all units, patients turnover greatly increased, and there was a low re-admission rate. The model was substantially cheaper than psychiatric care in two units where it was fully implemented; one unit cost the same as psychiatric care, and two units were not cost-effective because of low occupancy – related to not fully implementing the model. Referring facilities reported that in the absence of the units, their main strategy would have been to increase sedation. In the Transitional Behavioural Assessment and Intervention Service units, behavioural incidents were primarily managed through psychosocial means. It is not known whether behaviour is reduced over time, staff become better at managing the behaviour when it occurs, or both.

Conclusion: The evaluation showed that the model can be transferred to other units and is a cost-effective way of assessing, managing, and successfully discharging people with complex challenging behaviours, though only when fully implemented.

Keywords

challenging behaviours, dementia, behavioural and psychological symptoms of dementia, case-specific, bio-psychosocial approaches, inpatient units

Behavioural and Psychological Symptoms in Dementia (BPSD) are defined as: ‘Signs and symptoms of disturbed perception, thought content, mood or behaviour that frequently occur in patients with dementia’ (Finkel, Silva, Cohen, Miller, & Sartorius, 1997, p. 1060). BPSD includes a range of phenomena such as violent resistance in personal care, other aggressive responses, repetitive questions, yelling or screaming, sexual disinhibition, and apathy. It causes significant distress to the person with dementia and family carers and is the most common reason for admission to residential care (Gilley et al., 2004) where the behaviours tend to be significantly more florid and cause equivalent distress to care staff (e.g. Evers, Tomic, & Brouwers, 2002; Wood et al., 1999).

Treatment approaches

Treatment for BPSD, especially in residential aged care, is problematic. There is extensive evidence of over-reliance on psychotropic medication, in particular antipsychotics (Ballard & Waite, 2006), despite meta-analyses since 1990 showing modest efficacy at best and frequent side effects (Deberdt et al., 2005; Herrmann, 2001; Margallo-Lana et al., 2001). Sink, Holden, and Yaffe (2005, p. 607) concluded: *There is no magic pill for BPSD*. This appears equally true for standardised psychosocial interventions. Though some methods, for example multi-sensory therapy show promise in some studies, results are uneven, methodology often poor and, overall, there is no evidence that applying a standardised

approach as though it is a psychosocial pill is any more effective than standardised psychopharmacology (Ayalon, Gum, Feliciano, & Arian, 2006; O'Connor, Ames, Gardner, & King, 2009).

A plausible reason for the limited effectiveness of standardised pharmacological or psychosocial treatments is that the contexts in which behaviours occur vary along several dimensions. Firstly, there are multiple causal factors behind any one case of BPSD, including genetic, neurobiological, psychosocial, medical, and sensory considerations. Secondly, variability of emotional and practical response of carers or nursing staff to patients means great diversity in what constitutes 'challenging behaviour', or even the extent to which a given behaviour occurs. Thirdly, interventions have to be tailored to what is possible in any given case because the capacity and resources of both the person with dementia and carers or care staff will also vary widely (Bird, Llewellyn-Jones, & Korten, 2009; Cohen-Mansfield, Libin, & Marx, 2007; Davison, Hudgson, McCabe, George, & Buchanan, 2006; Edvardsson, Sandman, Nay, & Karlsson, 2008; Moniz-Cook, Woods, & Gardiner, 2000).

An early attempt to adopt a holistic contextual approach to people manifesting BPSD was special care units. Though there is a disparate literature, a recent Cochrane Review defines common features as regularly trained specialist staff, dementia-appropriate activity through the day, family involvement in care, and a specially designed physical environment (Lai, Yeung, Mok, & Chi, 2009). In Australia, New South Wales (NSW) Health established a number of units using these principles in the 1980s: long-stay 16-bed units for the 'Confused and Disturbed Elderly' (CADE; Fleming & Bowles, 1987). Over time CADE units lost direction, mostly providing long-term care for people who were easy to manage. Lack of turnover meant that most cases with significant challenging behaviour had to be managed in mainstream residential care, or, in really severe situations, acute psychiatric wards – often ill-equipped for this population (Gresham, 2006; Yazgan, Greenwald, Kremen, Strach, & Kramer-Ginsberg, 2004).

From CADE to T-BASIS

Because of low turnover NSW Health commissioned a review of the remaining CADE units to see if they could better fill a service gap between acute inpatient care and long-stay residential care (Stewart, O'Connor, Cameron, & Kurrle, 2006). Stewart et al. found that, though most retained the old long-stay (up to five years) model with minimal specialist input, two had developed into successful medium-stay assessment–treatment–discharge units, though one subsequently closed. The remaining unit, which had received Australian Government funding to transform itself in 2004, therefore became the model pilot for the state. Length of stay was 2–3 months, facilitated by a small integrated outreach team whose role was to manage most BPSD cases in the community where possible, build capacity in residential care, and smooth the progress of people admitted to and discharged from the unit. There was 24-hr nursing coverage, weekly access to geriatric and psychogeriatric support, and emergency medical support after hours. The model also involved specialist staff training, and participation in weekly multidisciplinary case reviews, where staff contributed to developing and implementing care plans.

These findings matched a concurrent report based on a literature review and visits to services which appeared to produce optimal care for challenging behaviour, and which concluded that key factors were: comprehensive multi-disciplinary (medical, psychiatric,

social, and environmental) assessment and intervention; accepting that the intervention process can be time and staff intensive; making management strategies highly patient specific; making the patient's family and/or residential care staff integral to the intervention process; accepting the important role of the physical design; and, where possible specialist community teams integrated with sub-acute inpatient facilities (NSW Health, 2006).

NSW Health provided funding and support so that the remaining four CADE units could convert to the pilot site model, to be called the Transitional Behaviour Assessment and Intervention Service (T-BASIS). One unit was in metropolitan Sydney; four, including the pilot site, in very large NSW rural health areas.

Current evaluation

From January 2009 to December 2010 the authors gathered data to determine whether all the units now adhered to the T-BASIS model, to look at clinical and cost-effectiveness, and provide guidance for further improvements (see Bird, Anderson, Blair, & MacPherson, 2011). For the purposes of this paper, we look mainly at whether the model is transferable and sustainable, whether it has improved service availability, and whether it is clinically effective.

Method

Ethics

Overall approval for the study was obtained from the Hunter New England Human Research Ethics Committee (Protocol Number: HREC/09/HNE/22), with approval for the sites provided by Greater Southern Area Health Service Human Research Ethics Committee, Hunter New England Human Research Ethics Committee, and Western Sydney Human Research Ethics Committee.

Design

The evaluation was a repeated measures design, supplemented by multiple one-time measures. We collected data from two sets of patients. Firstly, patients who were in each T-BASIS unit at the first data collection wave (Wave 1) were included to assess process and outcome variables such as the way behaviour was managed and length of stay. Secondly, because there were few standard measures in use prior to our evaluation enabling comparisons across units, we used standard measures to track up to 15 consecutive new admissions in each unit after Wave 1 from admission to post-discharge. At Wave 2, we collected data on people who had been discharged in the interim or were still in the units. The time between Wave 1 and final follow-up (Wave 2) was between nine and 11 months.

Participants

Participants were: (a) patients in each T-BASIS unit at Wave 1 ($N=50$, $M_{Age}=74.52$, $SD=9.77$), or who were admitted and tracked thereafter ($N=68$, $M_{Age}=78.30$, $SD=7.19$); (b) staff in the units who consented to participate ($N=76$, $M_{Age}=47.95$,

$SD = 10.32$); and (c) senior staff in residential aged care facilities (RACFs) to which patients were discharged.

Measures

Adherence to the model. We compared data from 2007, before the T-BASIS model was implemented and 2010, looking at staffing, median length of stay, and number of admissions. We also looked at where patients came from to assess the effectiveness of the outreach team.

Patient characteristics. The following information was obtained from the medical records of each patient: primary and secondary diagnosis, reason for admission, where they were admitted from, medical and/or psychiatric co-morbidities, reason for discharge, readmission rates during the data collection period, and the services/facilities to which they were discharged.

Clinical process and practice. Staff responses to challenging behaviour: From the medical records, how staff responded to each behavioural incident was coded by a member of the research team, where this was documented, as: (a) psychosocial intervention, (b) administration of (*Pre Re Nata*: 'as required') (PRN) psychotropic medication, (c) both psychosocial and psychotropic in nature or (d) not documented. If the nature of the response was not clear to the researcher, another team member was consulted and consensus sought. This was examined for two weeks after admission and two weeks before discharge.

What if there wasn't a T-BASIS unit to refer them to? Where patients were discharged back to the aged care facility which had originally referred them, interviews were conducted with the facility's senior staff, who were asked what they would have done if there was no T-BASIS unit or service.

Clinical outcomes. Challenging behaviours: For the admissions tracked after Wave 1, unit staff completed the Cohen-Mansfield Agitation Inventory – Short form (CMAI-SF; Cohen-Mansfield, 1995), a checklist of 14 behaviours where respondents rate frequency on a seven-point Likert scale from 'Never' to 'Several times an hour'. Three staff members completed these measures for the same patient at admission and discharge wherever possible, since respondents differ widely in their perception and response to the same behaviour by the same patient (Bird, Llewellyn-Jones, Korten, & Smithers, 2007). We also extracted the frequency and nature of behavioural incidents from the case files of each tracked patient for the first two weeks after admission and two weeks before discharge. To obtain a staff proxy of how difficult patients were, we also asked three staff members how stressed the most characteristic behaviour of each patient made them on a five-point scale. This simple measure has good repeated measure reliability when given to the same staff at each time point (Bird et al., 2007).

Cost-effectiveness. Using de-identified patient data from the NSW Health Information Exchange (NSW Health, data extracted on '21 Sep 2010'), the number of admissions and readmissions for the 2009/2010 financial year and the average length of stay (A LOS) were calculated for (a) each T-BASIS unit and (b) for people with dementia admitted to other

mental health beds (e.g. acute adult psychiatric unit) within the same health catchment area as the T-BASIS units. To ascertain the costs of operating a T-BASIS unit, we obtained the proposed 2010/2011 budget for the benchmark unit, Unit 1. The NSW Health Services Comparison Data Book 2008/09 (NSW Health, 2010) was used to determine the cost of mental health.

From these sources of information, we calculated the average cost per person for the T-BASIS units versus all other mental health beds, using the following formula

$$\text{Cost per person} = \frac{\text{Daily bed cost} \times \text{A LOS} \times \text{No. of admissions}}{\text{No. of admissions} - \text{No. of readmissions}}$$

At full occupancy, the daily bed cost for a T-BASIS unit was AU\$306.31. This cost was used for each unit, adjusted to reflect the varying occupancy and readmission rates.

Results

Adherence to the model

For the purpose of reporting results, the rural health units are 1–4, including the pilot site (Unit 1). Unit 5 is in metropolitan Sydney.

By the time of the evaluation, all units had access to both a geriatrician and psychogeriatrician – one of whom was medical director – to a combined total of 6–10 hr per week. Other medical cover, usually registrars or local GPs, was available as required. Care staff were mostly registered and enrolled nurses, and total number of staff spread across three shifts ranged from a mean of 10.85 individuals per day (Unit 1) to 12.92 (Unit 4). This represented an increase of up to three staff per day for the units which were newly adopting the T-BASIS model and no change for Unit 1 which had developed the model. One unit had no outreach clinicians throughout the evaluation period and another had one for only six months.

Patient characteristics

Primary diagnoses on admission. The units overwhelmingly admitted ambulant people with dementia (fitting the intended unit model), though between 5 and 10% had mental illness as the primary diagnosis. The most common dementia diagnoses were Alzheimer's disease, vascular dementia, or dementia unspecified. Psychosis was the most common mental health diagnosis. Significant physical/medical health co-morbidities were present in 90–100% of the sample; many with multiple serious medical conditions (up to 10), and 40–75% had mental health co-morbidities. On the clinical dementia rating (CDR; Morris, 1993), patients largely fell within the moderate (38.24%) or severe range (33.82%), with 17.65% in the mild range. Those assessed as 'no dementia' (1.47%) and 'questionable dementia' (8.82%) primarily had mental illness.

Reason for admission. Table 1 shows that patients were admitted to the T-BASIS units primarily because of behaviour. In many cases, there was more than one behaviour recorded. The majority of patients were admitted to the T-BASIS units from home (46.61%) or residential care (40.68%).

Table 1. Percentage of patients in each T-BASIS unit with specific behaviours and other reasons for admission.

	T-BASIS Unit				
	1 (n = 30) (%)	2 (n = 21) (%)	3 (n = 25) (%)	4 (n = 22) (%)	5 (n = 20) (%)
Behaviours					
Absconding	2 (6.70)	3 (14.30)	1 (4.00)	1 (4.50)	0 (0.00)
Wandering	3 (10.00)	1 (4.80)	2 (8.00)	4 (18.20)	0 (0.00)
Physical aggression ^a	10 (33.30)	2 (9.50)	0 (0.00)	4 (18.20)	3 (15.00)
Verbal aggression	7 (23.30)	0 (0.00)	1 (4.00)	2 (9.10)	1 (5.00)
Hallucinations	1 (3.30)	1 (4.80)	1 (4.00)	3 (13.60)	0 (0.00)
Delusions	4 (13.30)	0 (0.00)	1 (4.00)	0 (0.00)	0 (0.00)
Intrusiveness	0 (0.00)	1 (4.80)	2 (8.00)	3 (13.60)	2 (10.00)
Repetitive behaviours	0 (0.00)	1 (4.80)	1 (4.00)	1 (4.50)	1 (5.00)
Sexual disinhibition/inappropriate	0 (0.00)	4 (19.00)	2 (8.00)	1 (4.50)	2 (10.00)
Calling out	1 (3.30)	1 (4.80)	0 (0.00)	0 (0.00)	0 (0.00)
Pacing	0 (0.00)	2 (9.50)	0 (0.00)	1 (4.50)	0 (0.00)
Resistive to care	0 (0.00)	4 (19.00)	0 (0.00)	0 (0.00)	0 (0.00)
Tearfulness	0 (0.00)	2 (9.50)	1 (4.00)	2 (9.10)	0 (0.00)
Agitation	1 (3.30)	1 (4.80)	1 (4.00)	3 (13.60)	2 (10.00)
Poor medication compliance	1 (3.30)	2 (9.50)	1 (4.00)	2 (9.10)	0 (0.00)
Other					
Assessment	0 (0.00)	0 (0.00)	4 (16.00)	0 (0.00)	0 (0.00)
Delirium	0 (0.00)	0 (0.00)	2 (8.00)	0 (0.00)	0 (0.00)
Alcohol withdrawal	0 (0.00)	3 (14.30)	0 (0.00)	0 (0.00)	1 (5.00)
Self-neglect/squalor	0 (0.00)	2 (9.50)	0 (0.00)	1 (4.50)	2 (10.00)
Respite	0 (0.00)	2 (9.50)	0 (0.00)	1 (4.50)	1 (5.00)
Awaiting placement	0 (0.00)	1 (4.80)	1 (4.00)	0 (0.00)	1 (5.00)
Number of residents with two or more behaviours					
Two named behaviours	23.30	14.30	12.00	18.20	20.00
Three named behaviours	13.30	23.80	4.00	4.50	0.00
Four or more behaviours	0.00	0.00	0.00	13.60	0.00

^aMany of the behaviours described as physical aggression took place in intimate personal care (e.g. showering, toileting, dressing/undressing).

Patient characteristics on admission in 2010 were not substantially different from those obtained before the T-BASIS model was introduced in 2007. However, there was a tendency for fewer admissions to come from home; this was especially marked for the two rural facilities with outreach teams throughout, with roughly three times as many patients coming from residential care facilities (see Table 2). There was little change in the other units. For the same two sites, more admissions were coming from much further away, suggesting that the units, which are meant to cover enormous geographic distances, were providing more of a health area-wide service by 2010, as opposed to just the town where the unit was situated. There was little improvement or deterioration for the sites which had no outreach team for some or all of the evaluation period.

Table 2. Comparison where did they come from? 2007–2010.

T-BASIS Unit																			
1		2			3			4			5								
2007 (n = 12) (%)		2010 (n = 30) (%)		2007 (n = 13) (%)		2010 (n = 21) (%)		2007 (n = 9) (%)		2010 (n = 25) (%)		2007 (n = 4) (%)		2010 (n = 22) (%)		2007 (n = 8) (%)		2010 (n = 20) (%)	
Accommodation																			
Home		75.03		46.70		61.60		38.00		44.40		25.00		31.80		25.00		55.00	
Residential care		16.70		46.70		15.40		52.40		33.30		50.00		54.50		0.00		25.00	
Inpatient facility		0.00		0.00		15.40		9.50		0.00		25.00		13.60		62.50		20.00	
Other		8.30		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00	
Missing		0.00		6.70		7.70		0.00		22.20		0.00		0.00		12.50		0.00	
Geographic area																			
Town where situated		66.70		33.30		69.20		28.60		44.40		25.00		27.30		0.00		20.00	
<50 km		0.00		3.30		7.70		0.00		0.00		25.00		40.90		75.00		70.00	
50–100 km		8.33		10.00		15.40		19.00		22.20		0.00		22.70		0.00		5.00	
> 100 km		25.00		46.70		7.70		38.10		0.00		50.00		9.10		0.00		0.00	
Missing		0.00		6.70		0.00		14.30		33.30		0.00		0.00		25.00		5.00	

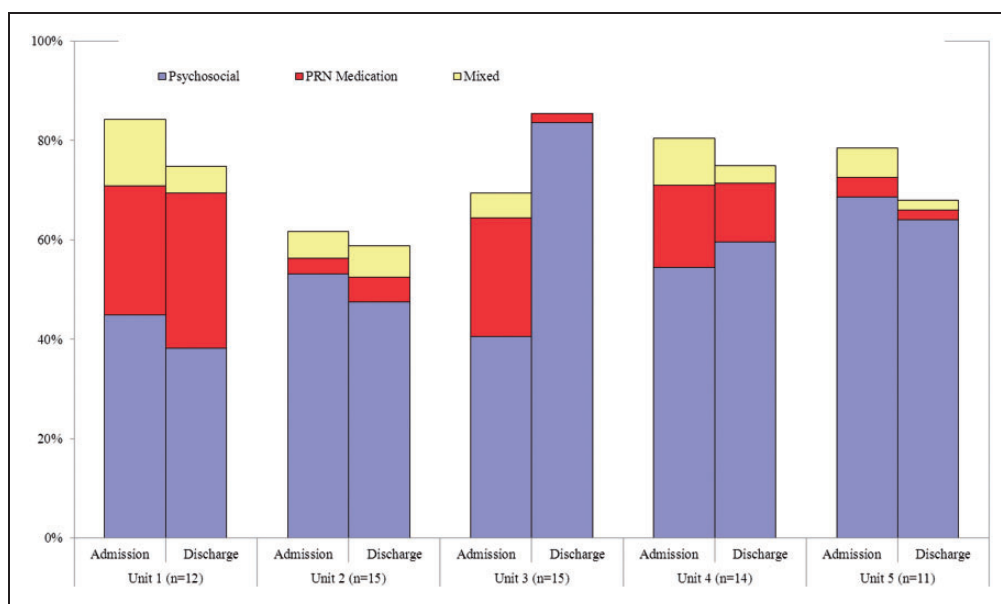


Figure 1. Percentage of behaviours responded to by using psychosocial interventions, PRN medications, or a mix of psychosocial and medication, in first two weeks after admission and the last two weeks before discharge.

Clinical process and practice

Response to behavioural incidents. Figure 1 presents the proportions of psychosocial, medication, and combined responses to behavioural incidents recorded in the medical records of tracked patients in the two weeks immediately post-admission and the two weeks before discharge. All units predominantly rely on psychosocial means to resolve incidents and for Unit 3 the use of PRN medications has very nearly disappeared by the time the patient is discharged, replaced almost entirely by psychosocial interventions.

What would you have done? When senior staff at referring facilities were asked, 'What would you have done if there was no T-BASIS unit or service?', 40.7% said they would have used sedation, 18.5% said they would have demanded a medical review from the GP, 18.5% would have referred to a psychogeriatric unit, 7.4% stated they would have sent the patient to the Emergency Department of the local hospital, 7.4% said they would have referred to the local mental health team, and 7.4% would have used one-to-one special care.

Clinical outcomes

CMAI-SF. Repeated measures analysis of variance was conducted, with behavioural disturbance (CMAI-SF representing number of behavioural incidents) as the dependent variable, T-BASIS unit as the independent variable, and time (T1, T2) as the within-subjects variable. Figure 2 shows CMAI-SF scores over time. Despite apparent improvements in four facilities and an increase in behaviours in one, time effects on this

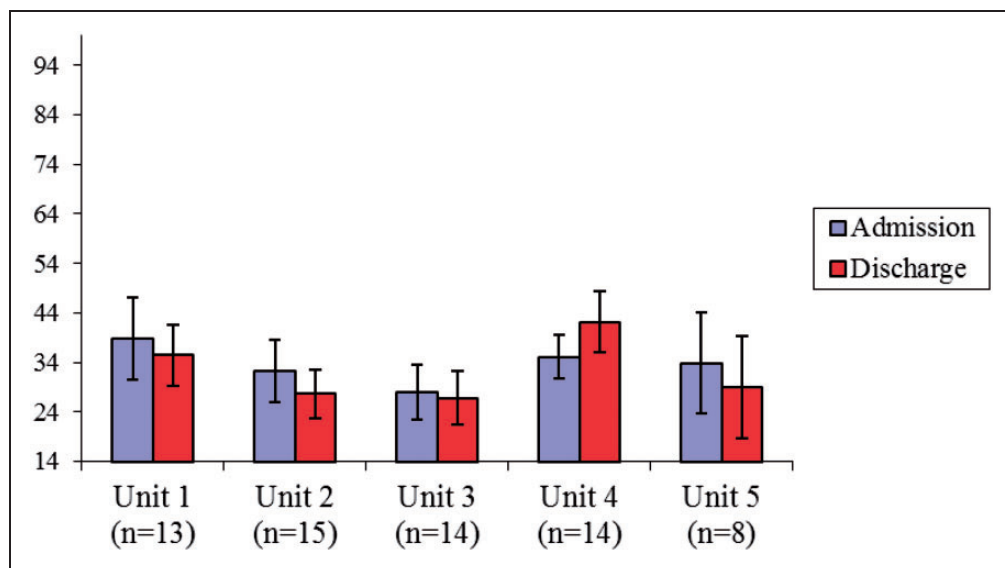


Figure 2. Mean CMAI-SF scores for admission and discharge (+95% confidence intervals) by unit.

scale were non-significant ($F_{(1,62)} = .05$, $p = .83$, $\eta^2 = .01$), as was the interaction between time and unit ($F_{(4,62)} = 1.09$, $p = .37$, $\eta^2 = .07$). However, there were differences in the level of behavioural disturbance seen in each unit ($F_{(4,62)} = 4.88$, $p = .01$, $\eta^2 = .24$), with patients in Unit 1 displaying greater agitation than patients in Units 2, 3, and 5 ($p < .05$) and patients in Unit 4 displaying more agitation than those in Units 2 and 3 ($p < .05$).

Number of behavioural incidents. Repeated measures analysis of variance showed a significant decline in the number of behavioural incidents reported in the medical records between the first two weeks after admission and the last two weeks before discharge, with a significant main effect of time, $F_{(1,61)} = 33.84$, $p = .01$, $\eta^2 = .36$ (Figure 3). A significant main effect for units was also observed, $F_{(4,61)} = 5.15$, $p = .01$, $\eta^2 = .25$, with more behavioural incidents occurring in Unit 1, $p = .01$. The interaction between time and units was non-significant, $F_{(4,61)} = .49$, $p = .74$.

A similar pattern emerges with staff stress levels (Figure 4). There is a significant decrease in stress over time $F_{(1,57)} = 5.99$, $p = .02$, $\eta^2 = .10$ and a main effect for unit $F_{(4,57)} = 4.47$, $p = .03$, $\eta^2 = .24$, with staff in Unit 1 more stressed than the other units, $p = .09$.

That is, based on CMAI data, frequency of behavioural incidents, and staff stress, it is clear that Unit 1, which developed the model and has the most experience, appears still to be taking more difficult residents than the other units. There is no evidence from the CMAI, the most objective measure, that frequency of challenging behaviour declined but there is a decline in reported behavioural incidents and staff stress.

Placement, reason for discharge, and readmission rates. After an average LOS of 17 weeks, most patients were discharged to residential care (73.79%). Others were discharged home (3.88%) or to another inpatient facility (3.88%), while some remained in the unit at the end of data collection (8.74%). Where the reason was listed ($n = 104$), the majority of patients were

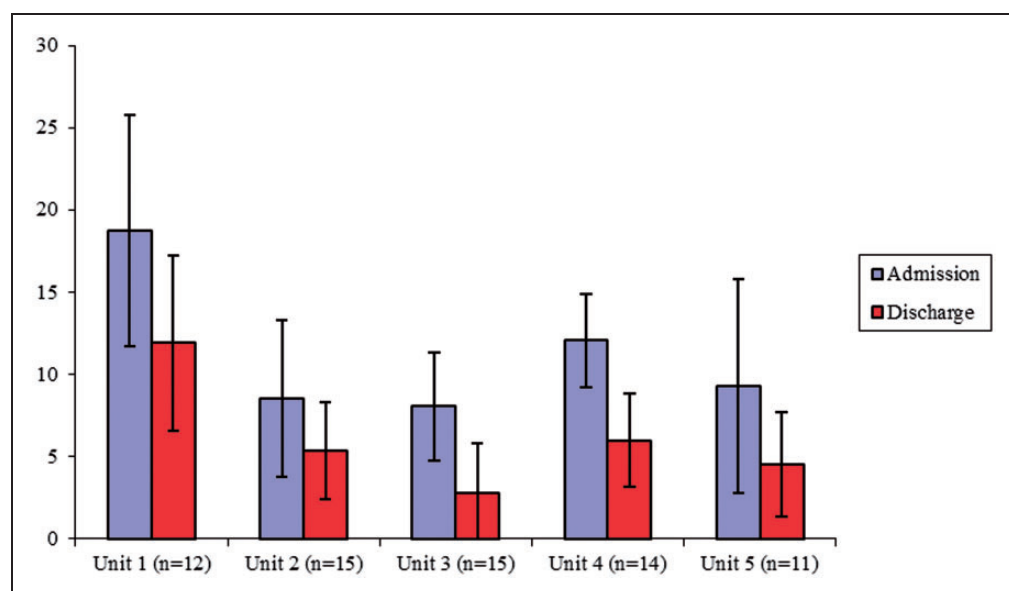


Figure 3. Average number of behavioural incidents recorded in progress notes per patient at admission and discharge (+95% confidence intervals) by unit.

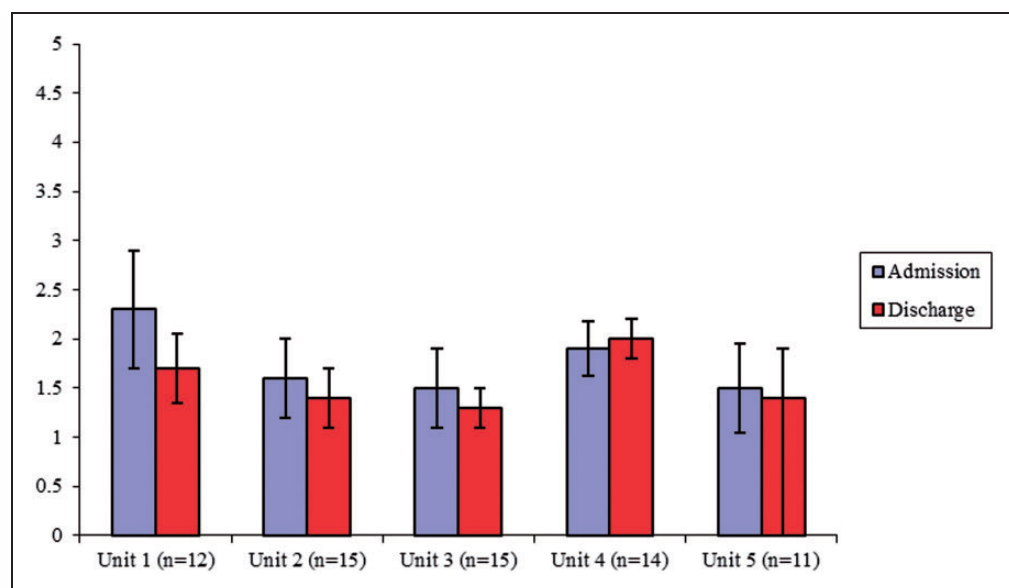


Figure 4. Mean stress scores for admission and discharge (+95% confidence intervals) by unit.

Table 3. Number of admissions, length of stay, and bed occupancy by unit over time.

	T-BASIS Unit									
	1		2		3		4		5	
	2006/ 2007	2009/ 2010	2006/ 2007	2009/ 2010	2006/ 2007	2009/ 2010	2006/ 2007	2009/ 2010	2006/ 2007	2009/ 2010
Number of admissions	47	49	12	57	17	31	3	17	14	24
Median LOS in days	269.50	72	801	85	142	106	256	68	559	56
Percentage of beds occupied	58.85	70.83	71.88	68.75	57.33	75.52	21.35	46.88	60.42	42.78

discharged because their behaviour had settled (74.04%). Acute physical illness and physical deterioration accounted for another 10.58% of discharges, while less than 1% were moved to another unit due to an increase in behaviours and 5.77% had died. The overall readmission rate was 8.26%.

Length of stay, number of admissions, and occupancy. Table 3 shows the clearest evidence of change attendant on introduction of the T-BASIS model.

Cost-effectiveness. As can be seen from Table 4, compared with the costs of care in an acute psychiatric unit, Units 1 and 2 provided a net saving of approximately AU\$63,172.00 per patient and an overall saving of AU\$2,526,880.00 during the evaluated financial year. Unit 3 is roughly equal cost and the other two units were not cost-effective, with losses directly related to longer lengths of stay and/or low levels of occupancy. Overall, the T-BASIS program as a whole realised a net saving of AU\$3,808,509.84 during the evaluated financial year.

Case studies

Two case studies that emerged from the data are detailed below in order to illustrate the nature of the T-BASIS patient population, how the units managed them and, more generally, something about the nature of case-specific psychosocial interventions for this population, which have no relationship with standardised therapies.

Case 1 presented to a medical ward after a fall at home, with physical difficulties related to the fall, multiple physical co-morbidities including osteoporosis and recurrent urinary tract infections, dementia, and polypharmacy including an antipsychotic. In the ward she continuously wandered and got into bed with other patients and frequently had to be removed by security staff. To contain her behaviour she was given benzodiazepine and an antipsychotic, restrained using manacles, and specialised for seven consecutive days (at an estimated cost of between AU\$3,500 and \$5,500). Despite being admitted after a fall this patient was not receiving any pain relief.

When placed in the T-BASIS unit, there were no incidents of aggression or inappropriate behaviour in the first 48 hr and few incidents thereafter. The design of the units enabled doors to be locked to stop her wandering into other bedrooms but the main 'treatment' was

Table 4. Financial comparison of T-BASIS units with mental health beds.

	T-BASIS 2009/2010	Mental health beds
Unit 1		
ALOS	85.44	123.08
No. of admissions	41	25
No. of readmissions	1	5
Cost per bed day	\$510.15	\$701.00
A Cost per person	\$44,676.90	\$107,848.90
Unit 2		
ALOS	64.84	123.08
No. of admissions	49	25
No. of readmissions	9 ^a	5
Cost per bed day	\$562.46	\$701.00
A Cost per person	\$44,675.64	\$107,848.90
Unit 3		
ALOS	115.71	119.07
No. of admissions	28	28
No. of readmissions	4	5
Cost per bed day	\$551.58	\$506.00
A Cost per person	\$74,460.54	\$73,347.12
Unit 4		
ALOS	126.62	119.07
No. of admissions	21	28
No. of readmissions	3	5
Cost per bed day	\$672.07	\$506.00
A Cost per person	\$99,280.42	\$73,347.12
Unit 5		
ALOS	93.43	35.10
No. of admissions	21	49
No. of readmissions	2	7
Cost per bed day	\$910.81	\$1,334.00
A Cost per person	\$94,054.55	\$54,487.23

^aReadmission rates from the Health Information Exchange, which includes patients readmitted to T-BASIS units after stays in acute hospitals for medical reasons and includes multiple readmissions of the same patients. Rates are higher than recorded in Table 1, which only includes those who were discharged as settled, then readmitted because of similar behaviour.

redirection by staff pre-empting problems. The antipsychotic and benzodiazepine were ceased and she was given substantial pain relief medications. She was discharged to residential care after 12 weeks.

Case 2 had alcohol related dementia and was admitted from a RACF because of severe aggression. He punched staff in response to any attempt at personal care, at other patients who got in his way, and at his own reflection. He was incontinent, urinating whenever/wherever he had to, but assaulted staff who tried to insert incontinence pads. He moved furniture at night. He frequently refused medications. Early assessment showed a broken hand, a urinary tract infection, and constipation. None of these medical issues had been

identified in the RACF. Treatment of these causal factors led to some settling of the behaviour but physical aggression remained a problem. Practical strategies were implemented, such as closing the curtains in his room so that he couldn't see (or punch) his reflection. In addition, staff used techniques such as 'go away and try again later', and having females instead of males showering him. These strategies were only intermittently effective.

One month after admission, the consensus was that his behaviour was much the same and unlikely to change but that it could be managed around. For example, he now urinated in a finite number of places and staff accepted that frequent clean-ups were necessary, although staff had learned to interpret the patient's urination cues and were sometimes successful in slipping a bucket in place at strategic moments. The patient was discharged to his previous RACF with information about practical strategies and reasonable expectations about his care. He remained there and, although he was difficult to care for, staff understood that a range of care management strategies had been tested and that there was nothing more they can do. This case illustrates the way a case can remain 'unsolved', with no change in behaviour but that empowering, informing, and supporting already skilful residential care staff is often sufficient.

Discussion

The T-BASIS units exist primarily to assess, develop medico-bio-psychosocial management plans for, and appropriately discharge people with dementia who are manifesting significant levels of challenging behaviour which cannot be managed in their current location.

Challenging behaviour associated with dementia remains the core business of the units but across the sample about 50% of admissions had co-morbid mental illness and, in a significant minority, mental illness was the primary diagnosis. Almost the entire sample had significant and often multiple medical co-morbidities, which can be causal factors in challenging behaviours and confirm the need for geriatric medicine involvement. The complexity of presentations demonstrates the need for specialist services to provide case-specific care, and which employ specialist staff, rely on significant medical input and, ideally, work closely with an integrated outreach team. There is a large literature on over-reliance on psychotropic medication for this population (e.g. Sink et al., 2005) and access to geriatricians and psychogeriatricians means that an appropriate mix of pharmacological and psychosocial interventions is more likely. The responses of managers who sent patients to the T-BASIS showed that, in the absence of the service they would have used sedation (or increased sedation as most patients admitted from residential care were already on antipsychotics, mood stabilisers, and/or benzodiazepines).

Figure 1 shows that, as staff became familiar with patients and developed strategies, they were increasingly likely to respond with psychosocial measures rather than PRN psychotropics. The nature of these responses is almost impossible to define in any global way because they were patient and context-specific, and the two case studies are presented as illustration that psychosocial methods have much more to do with common sense, observation, knowledge of the patient, and humane nursing than standardised therapies and, in any case, are in stark contrast to the treatment patients may have received before admission to the unit, some highly costly (see Case 1). We contend that such approaches are common though rarely reported but examples can be found in Bird and Cook (2008) and broad approach to contextual treatment of BPSD in Bird et al. (2009).

How effective were the units?

Results from the *CMAI-SF* data suggest behaviours did not improve as a result of staying in the units. This is not due to faults in the instrument; the *CMAI* was sensitive enough to detect the superiority of Unit 1 in level of behaviour of clients, something clinically obvious to the visitor. There were significant declines in behavioural incidents between the first two weeks after admission and the last two weeks before discharge. This may reflect genuine reduction in behaviour but could also be due to staff becoming habituated to the behaviour or the patient, and thus no longer regarding the behaviour as 'challenging' enough to report. This is supported by equivalent decline in stress levels related to the behaviour and is an important clinical outcome in its own right because it means that after the patient's discharge, supported and informed residential care staff can come to the same perception. A good example is case study 2, where the behaviour of this very distressed patient remained essentially unchanged but, once staff in the nursing home knew more about him and were given support, they were able to cope with him. No change or even worsening of behaviour but increased capacity of staff to manage emotionally and practically can be a legitimate outcome (Bird et al., 2009).

The fact that reductions in number of incidents from admission to discharge are quite large, with some units seeing a reduction of up to half, the fact that nearly 75% of patients were recorded as settled at discharge, and the overall re-admission rate was only 8.26% suggests that at least some patients were more settled by the time they were discharged. Nevertheless, we cannot say unequivocally that behaviour declined as a result of treatment or that patients mostly stayed put after discharge as a result of management plans and support developed by the T-BASIS unit.

Our results show that financial considerations can align with appropriate, specialist care. The financial comparisons show that treating patients with dementia in T-BASIS units is much more cost-effective than comparable psychiatric inpatient care for people with dementia, provided the units can maintain the occupancy/length of stay balance. It is probable that the fact that the two most cost-effective units had most fully embraced the model, working closely with specialist outreach teams, made the correct balance more likely, were more likely to be admitting people from residential care, and providing a wider coverage across vast rural heath areas. More effective turnover will occur if clinicians are regularly in contact with residential facilities across the health area and are available to smooth the path of admission and discharge.

The most unequivocal results relate to service change and sustainability. Table 3 shows the clearest evidence of change attendant on introduction of the T-BASIS model, with a dramatic reduction in median length of stay over a one-year period, even for Unit 1, and a concomitant increase in number of admissions. All units have become sub-acute medium length of stay facilities, and are therefore available to many more patients. The most striking change is Unit 2, one of the facilities that had established an outreach team. Table 3 also shows that occupancy had been a problem for some units before the change, and, though it has improved – sometimes dramatically, under-occupancy remains a problem.

Our results also show that a similar specialist service can be maintained over time. Unit 1, which adopted the new sub-acute inpatient/integrated outreach team model in 2004 had maintained its standard. Despite fewer staff than the other four units, it is clear from our *CMAI*, behavioural incident, and staff stress data that it was still admitting more difficult patients. The difference in length of stay and number of admissions data between 2007 and

2010 show that the model can be transferred to other units. The fact that more patients were coming from residential care, where typically the most florid behaviour occurs (Evers et al., 2002; Wood et al., 1999), suggests that the units which adopted the model were taking more difficult residents than when they were still traditional CADE units though, again, this cannot be determined unequivocally.

Cumulatively, the current findings show:

- (1) The T-BASIS units largely accept patients with a variety of significant challenging behaviours as well as mental health and physical/medical health co-morbidities and dementia. People are often admitted to the units because the resources of their RACF are insufficient to provide appropriate management where they are. The units apply a range of techniques but psychosocial/nursing approaches tend to increase over the patients stay.
- (2) After their stay at the unit patients usually return to their RACF with detailed management plans and very few are re-admitted. It is possible that this is because the behaviour declines and/or the unit is able to transfer management techniques but the evidence is unclear.
- (3) This model demonstrates that people with complex challenging behaviours can be managed in a way that is cost-effective and importantly, humane, and it is most clinically and cost-effective when combined with a specialist outreach service.
- (4) The model is sustainable given sufficient support.

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