1 Introduction

The interface between acute hospital care and residential aged care (RAC) has long been recognised as an important issue in aged care services research. Despite this, existing national data provide very poor information on the movement of clients between the residential and acute care sectors. Current national data sets on the two sectors are derived from routine administrative collections, and have been designed primarily to provide data on the specific program that they describe, rather than to examine program interfaces.

Over recent years, the Australian Institute of Health and Welfare (AIHW) has developed an event-based data linkage method to link national hospital morbidity data and RAC data, with the aim of improving national reporting on the acute care/aged care interface. For this report, national data were linked for 2001–02 to identify uni-directional movement straight from hospital to RAC. The resulting linked data provide a useful resource for investigating key policy questions, including:

- What is the extent of movement between the two sectors?
- Are older people staying too long in hospital before admission into residential aged care?
- What is leading to admission into residential aged care on discharge from hospital?
- What happens to people after admission into residential aged care on discharge from hospital?

Before data linkage was undertaken for this study, approvals for the project were obtained from required ethics committees, and permission to use the hospital morbidity and RAC data was obtained from all data custodians (national, state and territory).

The report is structured as follows. This section provides background information on the data being used, a summary of the linkage method and national estimates of flow from the hospital to the RAC sector. Section 2 examines regional differences in movement from hospital to RAC. A detailed examination of the characteristics of people leaving hospital, and their hospital stay, is given in Section 3, while in Section 4 the characteristics of people entering RAC are considered. Propensity to be discharged from hospital into RAC and outcomes for people moving into RAC are examined in Section 5. The interaction between health conditions and transition outcome is investigated in Section 6, focusing on people affected by dementia, stroke, or injury due to a fall. Further data developments that could improve the flexibility and accuracy of analyses from linked hospital and RAC data are discussed in Section 7. Appendix A contains additional tables for the states and territories and appendices B to F contain technical details concerning the linkage process and analyses.

1.1 Event data

In this study, hospital episodes which lasted at least one night and which ended with the patient either leaving hospital or dying were linked to RAC events in which the person was either admitted to or returned to RAC. A brief description of the data is presented below, with more detailed information given in Appendix B.

The hospital data used in this study came from the National Hospital Morbidity Database (NHMD), and included data for both public and private hospital separations (see Box 1.1 for key terms). Same-day hospital episodes, in which people are admitted and discharged on the

same day, were excluded as they are unlikely to be for transitions relating to either an admission into RAC or return to RAC following a period in hospital (although they could relate to a day procedure for a RAC resident).

If a patient transferred between hospitals or received more than one care type while they were in hospital, then their period of hospitalisation would have been reported as a number of contiguous episodes of care. Episodes that ended with the patient remaining in the hospital system were excluded from the analysis as they should not relate to movement from hospital into RAC. This meant that, even when a patient had more than one episode of care during a continuous period of care in hospital, only the characteristics of the last episode could be used for analysis. Whether or not a hospital stay is recorded as a single episode of care or as several episodes is affected by the implementation of casemix-based funding practices, which vary by state and territory and between urban and regional areas. The impact of this variation on reported care type and length of stay cannot be determined from the hospital data available for this report.

In 2001–02, across Australia there were almost 948,200 hospital separations for people aged 65 and over lasting at least one night and ending with the patient either dying (5.4%) or leaving the hospital (94.6%) (Table 1.1).

Box 1.1: Key terms in the hospital data

*An **episode** of care for an admitted patient (or inpatient) can be:*

- *a total hospital stay—from admission into hospital to discharge from hospital or death, or*
- *a portion of a hospital stay beginning and/or ending in a change of type of care (for example, from acute care to rehabilitation), or*
- *a portion of a hospital stay beginning and/or ending in a transfer from/to another hospital.*

*Accordingly, for two types of discharges the patient remains within the hospital system. In a **statistical discharge** a patient changes from one hospital episode care type to another (for example, from acute care to rehabilitation). A patient may also **transfer** from one hospital to another.*

*An episode of care ends with a **separation**. Consequently, the terms episode of care and separation are used interchangeably.*

*An episode of care starting and ending on the same day is called a **same-day** episode/separation. All other episodes of care are called **overnight** episodes/separations.*

***Length of stay** is derived for episodes of care. The length of stay of an overnight episode is calculated by subtracting the date the patient is admitted from the date of separation and deducting any days the patient was on leave. A same-day episode is allocated a length of stay of 1 day.*

*The **care type** of an episode of care defines the overall nature of a clinical service provided to an admitted patient during an episode of care (see Box 3.2 for details).*

*Both a **principal diagnosis** and **additional diagnoses** are assigned for each episode of care. The principal diagnosis is that diagnosis established after study to be chiefly responsible for occasioning the episode of admitted patient care. Other conditions that contribute to the complexity and cost of patient treatment are recorded in the NHMD as additional diagnoses; additional diagnoses may therefore not be inclusive of all comorbid conditions experienced by the patient.*

*Diagnosis codes are classified according to the ICD-10-AM Edition 2 diagnosis classification (see Appendix C). In this report, for ease of expression an ICD-10-AM chapter (which is a set of related diagnoses) is referred to as a **condition group**.*

Source: *AIHW 2003a, AIHW: Karmel et al. 2007b.*

Table 1.1: Hospital separations for people aged 65+, by state/territory, 2001–02

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	All
					Number				
Died in hospital	17,874	13,740	9,048	4,297	4,636	1,074	591	105	51,365
Left hospital	290,841	230,361	170,749	79,392	88,941	23,839	10,625	2,048	896,796
Total	**308,715**	**244,101**	**179,797**	**83,689**	**93,577**	**24,913**	**11,216**	**2,153**	**948,161**
					Per cent				
Died in hospital	5.8	5.6	5.0	5.1	4.9	4.3	5.2	4.9	5.4
Left hospital	94.2	94.4	95.0	94.9	95.1	95.7	94.8	95.1	94.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. Age is as at time of hospital admission.
2. Table excludes same-day hospital episodes, statistical discharges and transfers to other hospitals.

The RAC data were derived from the Department of Health and Ageing's Aged and Community Care Management Information System (ACCMIS). There are three main ways a client may enter or re-enter RAC (Box 1.2):

- as a new admission, for either permanent or respite care. A permanent admission may be preceded by pre-entry leave of up to 7 days
- returning from hospital leave after a permanent resident has had a period in hospital. Hospital leave is provided for hospital stays lasting at least one night
- returning from social leave after a permanent resident has had a period away from the RAC facility to visit family and/or friends.

The RAC data for this analysis included all RAC permanent and respite admissions and hospital and social leave events for the year of interest, totalling slightly more than 215,100 events for people aged 65 and over (Table 1.2). Nationally, less than half (46%) of the RAC events involved admissions, with the remainder being for people already in permanent care, that is the events were either hospital or social leave from RAC. However, this split varied across jurisdictions, ranging from 56% for admissions in the Northern Territory to 41% in Western Australia. The relative use of permanent and respite RAC also varied with jurisdiction.

Box 1.2: Key terms in RAC

*For a person to be able to access permanent and respite RAC, assessment by an Aged Care Assessment Team (**ACAT**) is required. An ACAT approval remains valid for 12 months. If a person's care needs change to the extent that a different level or type of care is required, they may be reassessed within that period.*

*A person may be admitted for **permanent care** in a RAC facility, with the RAC facility becoming the person's place of usual residence. A permanent admission may be preceded by **pre-entry leave** of up to 7 days. This leave gives a prospective resident time to make arrangements to enter an aged care home or to transfer from one home to another home in a distant location. Care is provided on a high-care or low-care basis, according to care needs appraised using the **Resident Classification Scale** (RCS), which is also used for determining the daily basic subsidy paid by the Australian Government. RCS categories 1–4 equate to high care and 5–8 equate to low care.*

*A person may be admitted for **respite care** in a RAC facility. Residential respite care is important both for people who need a higher level of care just for the short term and as a component of the carer support system, whether for emergency care or to provide a 'break' while carers attend to other affairs or take a holiday. A person can receive up to a total of 63 days of subsidised respite care in any financial year. This total covers respite admissions to all Australian Government-funded RAC services. However, if a person needs more than 63 days of respite care in the financial year, the ACAT may in some circumstances approve extension periods of 21 days at a time. Care is provided on a high-care or low-care basis, according to care needs appraised during the ACAT assessment.*

*A permanent RAC resident can take unlimited days of leave for the purpose of receiving hospital treatment, termed **hospital leave**. Hospital leave is provided for hospital stays lasting at least one night. **Extended hospital leave** is where a resident has hospital leave for a continuous period of 30 days or more. In this case, the daily basic subsidy paid to the RAC facility is reduced by two RCS categories.*

The Aged Care Act 1997 *provides **social leave** for residents of aged care homes of up to 52 days of overnight absences per financial year. This enables residents to spend each weekend, or 2 days plus one overnight absence per week, with their families if they wish to do so without losing their place at the RAC facility.*

Sources: *AIHW 2007a:chapter 3, DoHA 2005.*

Table 1.2: RAC events by event type for people aged 65+, by state/territory, 2001–02

RAC event type	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	All
					Number				
Permanent admission	20,961	14,644	10,084	4,739	5,470	1,337	559	100	57,894
Respite admission	15,385	9,986	7,228	3,190	3,813	1,471	740	200	42,013
Subtotal	*36,346*	*24,630*	*17,312*	*7,929*	*9,283*	*2,808*	*1,299*	*300*	*99,907*
Hospital leave, ending with:									
Return from hospital	19,299	13,390	11,712	5,732	6,330	1,083	557	98	58,201
Discharge to hospital	652	659	418	323	103	15	8	—	2,178
Death in hospital	2,270	1,543	1,288	598	622	110	63	16	6,510
Subtotal	*22,221*	*15,592*	*13,418*	*6,653*	*7,055*	*1,208*	*628*	*114*	*66,889*
Social leave	17,508	9,393	10,740	4,604	4,000	1,351	589	126	48,311
Total	**76,075**	**49,615**	**41,470**	**19,186**	**20,338**	**5,367**	**2,516**	**540**	**215,107**
					Per cent				
Permanent admission	27.6	29.5	24.3	24.7	26.9	24.9	22.2	18.5	26.9
Respite admission	20.2	20.1	17.4	16.6	18.7	27.4	29.4	37.0	19.5
Subtotal	*47.8*	*49.6*	*41.7*	*41.3*	*45.6*	*52.3*	*51.6*	*55.6*	*46.4*
Hospital leave, ending with:									
Return from hospital	25.4	27.0	28.2	29.9	31.1	20.2	22.1	18.1	27.1
Discharge to hospital	0.9	1.3	1.0	1.7	0.5	0.3	0.3	—	1.0
Death in hospital	3.0	3.1	3.1	3.1	3.1	2.0	2.5	3.0	3.0
Subtotal	*29.2*	*31.4*	*32.4*	*34.7*	*34.7*	*22.5*	*25.0*	*21.1*	*31.1*
Social leave	23.0	18.9	25.9	24.0	19.7	25.2	23.4	23.3	22.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. Age is as at time of RAC entry.
2. Table includes admissions within the year, and RAC leave events (including those ending in death in hospital or discharge to hospital) with a leave end date during the period 1 July 2001 – 30 June 2002.
3. Outcome of hospital leave is based on event dates and reason of discharge from RAC.
4. State/territory relates to the RAC outlet entered by the client.

1.2 Linkage method

Data linkage is a statistical tool that can be used to link data from different sources, thereby expanding the types of statistical investigations that can be carried out (including analysis of movement over time) without increasing the reporting load of service providers or requiring special surveys. Data linkage of records for individuals is commonly carried out using detailed demographic data, including name and/or a person identification number. While neither name nor a common person identification number are available for linking data from the hospital and RAC sectors, some demographic data are available. In addition, information on transition dates, that is entry and exit dates, is available for all periods of hospitalisation and residential care. In recent years, the AIHW has developed and refined an event-based method that uses such information to link transition events (AIHW 2003b; AIHW: Karmel 2004; AIHW: Karmel & Rosman 2007; Karmel & Gibson 2007). The effectiveness of this

method has been established both through theoretical analysis and direct comparison with a well-established name-based linkage strategy (AIHW: Karmel 2004; AIHW: Karmel & Rosman 2007).

For this analysis, linkage was undertaken using an event-based matching strategy that identifies links between events using demographic variables in conjunction with relevant event date information and event descriptors available on the NHMD and ACCMIS databases. The linkage strategy matched hospital separations to the relevant RAC entries. Delays of up to 2 days between hospital exit and RAC entry were allowed when identifying transition events—with the exception of admissions with arranged RAC pre-entry leave, where gaps of up to 7 days were allowed (see Box 1.2).

To protect the privacy of individuals, the linkage was carried out by the AIHW using the Institute's protocol *Data linkage and protecting privacy: a protocol for linking between two or more data sets held within the Australian Institute of Health and Welfare* (AIHW 2006). Key aspects of this protocol are that data linkage is undertaken using purpose-specific linkage data sets that contain only the data required for establishing and validating links, and that analysis files do not contain identifying data. A detailed description of the linkage process, including an overview of the linkage protocols, is contained in Appendix B.

Comparisons with a name-based linkage method have shown that the event-based linkage strategy results in few false matches and that linkage sensitivities are consistent across RAC event types (around 90%; see Table B.3). Consequently, the linked data provides a strong basis for examining transitions between hospital and RAC. In addition, while event-based links understate the total number of transitions, the linked data can be used to measure relativities between the different types of transitions from hospital into RAC.

Using event-based linkage a total of 76,179 transitions from hospital to RAC were identified (Table 1.3). Nearly two-thirds of these links (63%) were for people returning to permanent RAC, with the overwhelming majority of these relating to people on RAC hospital leave. Among the remaining links, admissions to permanent care out-numbered those to respite care by more than two to one (26% versus 10% of links).

1.3 Approximate estimates of flow

Measures of link quality show that event-based linkage more often tends to miss matches than make false matches (Table B.3). As a consequence, event-based linkage underestimates the total number of transitions and so cannot be used without adjustment to measure the volume of flow from hospital to RAC. While the Western Australian project was a one-off study limited to one year and one state, it was felt important to produce some national estimates for the overall flow of older people from hospital to RAC. To this end, approximate estimates were calculated using adjustment factors based on the results from the Western Australian study (Table 1.3) (see Appendix B for method).

The flow of people can be examined from two viewpoints:

(a) looking at the destination of people who are leaving hospital (that is, hospital separations)

(b) looking at the source of people who are entering permanent or respite RAC (that is, RAc admissions).

As stated before, during 2001–02 there were nearly 948,200 hospital separations for stays lasting at least one night for people aged 65 years and older. Of these hospital separations, an estimated 8.7% (82,500) were discharges into RAC, either as returns to RAC or as new

admissions (Table 1.3). The majority of these transitions were due to people living in RAC having episodes of hospitalisation (approximately 52,000, or 5.5% of episodes), rather than the result of people being admitted into RAC (approximately 30,400 or 3.2% of episodes). An additional 5.4% of separations from hospital ended with the death of the patient, with people returning to the community or going to other care arrangements for the remaining 86% of hospital separations.

On the other hand, during 2001–02 there were just over 99,900 admissions into RAC, either from the community, from hospital or through within-RAC transfers. It is estimated that almost one-third (30%) of these admissions were from hospital, of which nearly three-quarters related to permanent care (21.8/30.4 = 72%). Almost one-half of admissions came from the community (49%), and among these about one-third (16.6/48.7 = 34%) were for permanent care. The remaining one-fifth (21%) of admissions related to transfers within RAC—predominantly into permanent care.

From the perspective of the residential aged care sector, the above results mean that more older people made the transition to residential care on a permanent basis via hospitals (21,800, or 57% of non-transfer permanent admissions) than from the community (16,600). A further 19,500 permanent admissions related to transfers within RAC. Quite a different pattern was seen for respite admissions, with admissions from the community accounting for almost four times as many respite admissions as those from hospital (32,000 compared with 8,600). Transfers into respite care were a relatively small group (1,375 admissions). Overall, 8,000 RAC transfer admissions were for people moving from respite to permanent care and 11,700 involved permanent residents transferring between aged care homes (Table 1.3, note f).

Table 1.3: Movement types for hospital separations and RAC entries, people aged 65+, 2001–02

Type of movement	Estimates					
	Unadjusted			Adjusted		
	Number	Per cent		Number	Per cent	
Hospital separations						
Return to permanent RAC[a][b]						
From hospital leave	47,011	5.0	61.7	50,600	5.3	61.4
From hospital while on social leave	1,309	0.1	1.7	1,400	0.1	1.7
Subtotal	*48,320*	*5.1*	*63.4*	*52,000*	*5.5*	*63.1*
To permanent RAC[a][b][c]	20,117	2.1	26.4	21,800	2.3	26.4
To respite RAC[b][c]	7,742	0.8	10.2	8,600	0.9	10.4
Subtotal to RAC	*76,179*	*8.0*	*100.0*	*82,500*	*8.7*	*100.0*
To community/other[d]	820,617	86.5	. .	814,300	85.9	. .
Died in hospital[d]	51,365	5.4	. .	51,365	5.4	. .
Total separations	**948,161**	**100.0**	**. .**	**948,161**	**100.0**	**. .**
RAC admissions						
Permanent admissions						
From hospital to permanent RAC[a][c]	20,125	20.1	. .	21,800	21.8	. .
From community into permanent RAC[e]	18,261	18.3	. .	16,600	16.6	. .
Transfer into permanent RAC[e][f]	19,508	19.5	. .	19,508	19.5	. .
Subtotal	*57,894*	*57.9*	. .	*57,894*	*57.9*	. .
Respite admissions						
From hospital to respite RAC[a][c]	7,744	7.8	. .	8,600	8.6	. .
From community into respite RAC[e]	32,894	32.9	. .	32,000	32.1	. .
Transfer into respite RAC[e][f]	1,375	1.4	. .	1,375	1.4	. .
Subtotal	*42,013*	*42.1*	. .	*42,013*	*42.1*	. .
Total admissions	**99,907**	**100.0**	**. .**	**99,907**	**100.0**	**. .**

(a) Links to a permanent admission on the same or next day as the end of a period of hospital leave for the same person have been reassigned as linking to the hospital leave. This affected 266 links to permanent admissions.

(b) Based on linked hospital and RAC records. Same-day and next-day re-admissions into permanent RAC are treated as transfers and so have been combined into a single period of care when identifying returns to RAC after hospital leave.

(c) Estimates of transitions between hospital and RAC vary slightly depending on whether movements from hospital or into RAC are being examined due to transitions occurring across either the beginning or end of the financial year.

(d) Unlinked hospital separations for people leaving the hospital system. Deaths are based on reported hospital mode of separation.

(e) Transfers between RAC facilities.

(f) 41% of transfers into permanent RAC were from respite RAC and 87% of transfers into respite RAC were from respite RAC.

Notes

1. Age is as at time of hospital admission or RAC admission.
2. Table excludes same-day hospital episodes, statistical discharges and transfers to other hospitals.
3. Adjusted numbers for movements from hospital are rounded to the nearest hundred (see Appendix B).

1.3.1 Approach to analysis of movements

In this report we analyse the movement of people from hospital in two ways:

- by looking at where people go following discharge from hospital
- by comparing the characteristics of people making the various transitions.

As seen above, the event-based linkage strategy underestimates the number of transitions from hospital to RAC by around 8% (see Table 1.3). Consequently, within any sub-population, the proportion of all hospital discharges identified as relating to a move to RAC is underestimated and is not directly comparable with that of another sub-population. Furthermore, movement between the two sectors can only occur if the patient has not died in hospital, and so transitions are only of interest for those that leave hospital alive. Therefore, to aid interpretation, for sub-populations of interest the proportion of hospital separations not ending in death that related to transitions into RAC is presented, using a range to indicate the level of accuracy in these estimates of flow. However, because similar proportions of the three types of transitions to RAC were identified (see Table B.3), the relative sizes of the three transition types into RAC are compared directly without adjustment.

Using the above approach, the movement of people from hospital is therefore examined by first identifying deaths in hospital. Approximate estimates of flow are then derived to obtain an estimated range of the proportion of live separations from hospital that resulted in the patient moving into RAC (minimum = unadjusted estimate, maximum = estimate obtained by applying the maximum adjustment in Table B.4 to all identified transition records). After that, the proportion of transitions into RAC relating to returns to care and new admissions are examined using unadjusted numbers (see sections 2, 3 and 6). This process is illustrated in Figure 1.1.

When looking at admissions into RAC, unadjusted estimates understate the relative importance of admissions from hospital compared with admissions from the community. Therefore, to better gauge the mix of admissions from hospital and from the community, adjusted estimates are presented for a small number of classifications only (see Section 4).

Comparisons of the characteristics of people making the various transitions are undertaken using distributions based on unadjusted figures. Results from the linkage comparison study using Western Australian data indicated that such analyses are unlikely to be affected by the level of misclassification of transition type present in the current study (see Table B.3 and AIHW: Karmel & Rosman 2007: sections 7 and 8).

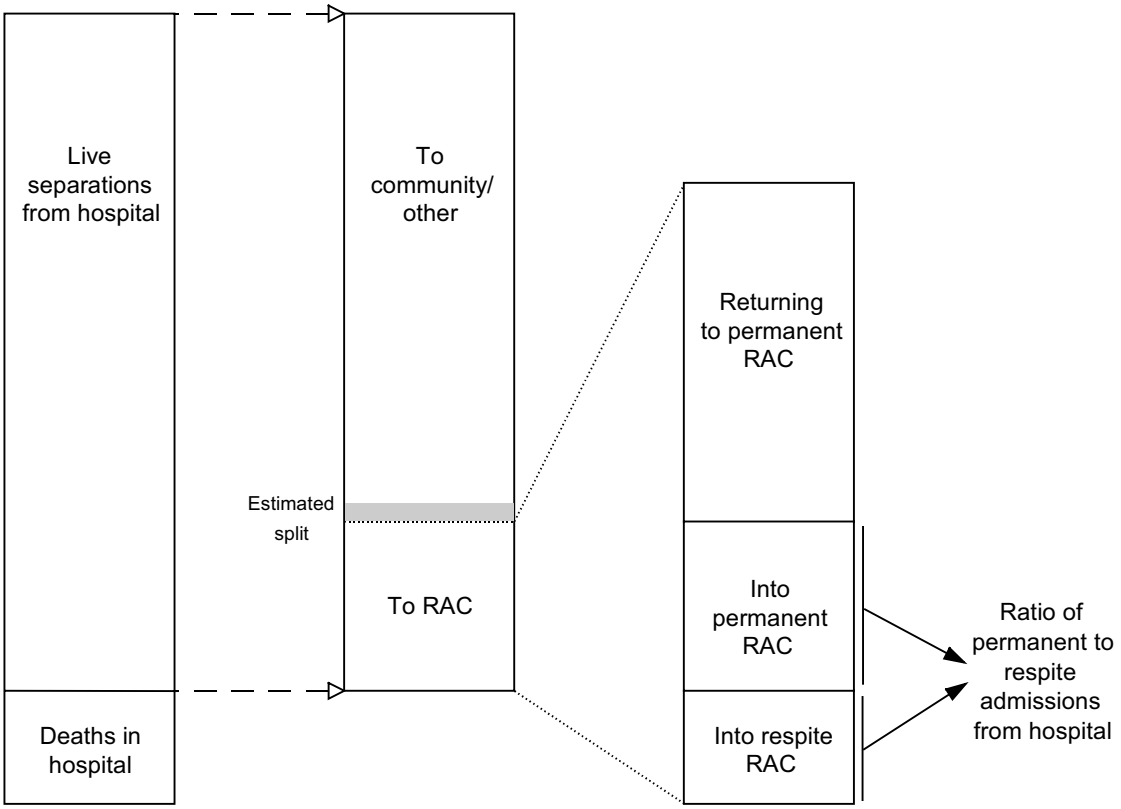

Figure 1.1: Schematic outlining the approach to analysis of movements