Interface between hospital and residential aged care

Feasibility study on linking hospital morbidity and residential aged care data

August 2003

Suggested citation

Australian Institute of Health and Welfare 2003. Interface between hospital and residential aged care: feasibility study on linking hospital morbidity and residential aged care data. AIHW Cat. No. AGE 31. Canberra: AIHW.

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Preface

In 2001, the Australian Institute of Health and Welfare (AIHW) independently commenced work on a project aimed at exploring the interface between residential aged care services and the acute hospital sector. The aim was to explore the feasibility of using existing national data collections to address key policy issues in this area. The approach adopted involved the creation of linked databases, undertaken on a probabilistic basis, drawing data from both the national hospital morbidity collection and the residential aged care collection.

Outside the AIHW the recognition of the need to improve the interface between acute hospital care, community care and residential aged care for older people led to the establishment of the Care of Older Australians Working Group by the Australian Health Ministers' Advisory Council (AHMAC). This Working Group developed a substantial work program during 2001.

Late in 2001 the AIHW agreed that the feasibility study being undertaken within the Institute would proceed during 2002 under the auspices of the Care of Older Australians Working Group. It was agreed that the project was directly relevant to the 'Data needs' component of the AHMAC Working Group's work plan, and that the support and expertise of the Working Group would facilitate the timely completion of the feasibility study. This report has been prepared as part of that agreement, and presents preliminary results of the tests which have been undertaken to explore the validity of the AIHW linkage strategy.

The study presented in this report was completed in June 2002 and is based on data for 1999–00. Four other projects were commissioned by the AHMAC Working Group, and it was agreed by Health Ministers that results from four of the five studies would be released together, with the fifth report being released when it has been finalised. Consequently, the publication of this report has been delayed by the need for completion of other projects. Reports from the projects can be found on www.health.gov.au/minconf.htm.

Acknowledgments

This report was prepared by staff of the Ageing and Aged Care Unit of the Australian Institute of Health and Welfare: Diane Gibson, Evon Bowler, Zhibin Liu and Rosemary Karmel. Peter Braun of the Unit extracted the relevant data from the residential aged care database.

The contributions of two other units within the Australian Institute of Health and Welfare were essential for the completion of this project. The Hospital and Mental Health Services Unit negotiated with the state and territory health authorities for permission to use hospital morbidity data in this study. In addition, Narelle Grayson and Ruth Penm extracted the required data from the hospital morbidity database. The Health Registers and Cancer Monitoring Unit undertook the linkage of the hospital morbidity and residential aged care data extracts. The work of Kate Leeds in this area is especially appreciated.

Summary of results and recommendations

Background

The interface between acute hospital care and residential aged care has long been recognised as an important issue in aged care services research. The recognition of the need to improve the interface between acute hospital care, community care and residential aged care in order to ensure that older people receive the most appropriate care led to the establishment of the Care of Older Australians Working Group by the Australian Health Ministers' Advisory Council (AHMAC). During 2001, this Working Group developed a substantial work program.

Despite general recognition of the importance of the relationships between the various care sectors, existing national data provide very poor information on the movements of clients between the residential and acute care sectors. This is not surprising as administrative by-product collections have historically only been designed with regard to the specific program or sub-program which they describe, rather than to provide information on program interfaces or system level information.

In 2001 the Australian Institute of Health and Welfare (AIHW) independently commenced work on a project aimed at exploring statistically the interface between residential aged care services and the acute hospital sector using currently available data. The aim was to explore the feasibility of linking the national hospital morbidity and residential aged care collections and using the resulting linked data set to address key policy issues. Late in 2001, the AIHW agreed that the feasibility study being undertaken within the Institute would proceed during 2002 under the auspices of the AHMAC Care of Older Australians Working Group. This report has been prepared as part of that agreement, and presents results of the tests which have been undertaken to explore the validity of the AIHW linkage strategy.

Linkage strategy

The absence of patient names in the Institute's national hospital morbidity data precluded data linkage using a statistical linkage key which includes all or part of name. The central hypothesis being tested in this project is whether a linkage key based on variables which include neither name nor part of name can provide a sufficiently robust linkage key to generate a useable linked database on individuals who move from the hospital to the residential care sector, as well as in the reverse direction.

The variables examined for the data linkage process were:

- date of birth (day, month and year);
- sex;

- geographic indicators of place of usual residence prior to admission (postcode and Statistical Local Area (SLA)); and

- date of separation from hospital care matched to date(s) of admission to residential aged care (matching on exact date, and matching on admission date within 3 days of separation date).

Both public and private hospital separations were included in the study.

Findings

Current indications suggest that the statistical linkage process tested in the study successfully generates a set of linked client records which could be used to examine the association between resident characteristics, dependency levels, and patterns of service use in residential aged care, and diagnostic and episode variables, and length of stay in the hospital sector. This linked data should provide a valuable source of information on the client characteristics and service use patterns associated with movements between the two sectors. Because of restrictions applied to the linkage process to avoid false matching, the resulting linked data set is not, however, recommended as a source of information on the size of client flows between the two sectors.

Preferred linkage strategy

Based on the available tests, date of birth, sex, exact separation date/admission date and SLA group of usual residence is the preferred linkage strategy.

In particular, after examining the results for a number of linkage keys, it was found that:

- Using a linkage key based on the three variables 'date of birth', 'sex' and 'exact separation date/admission date' does not allow sufficiently accurate identification of separations from hospital for linking with the residential aged care data. Adding a geographic indicator of client's usual residence overcomes this problem.

- Postcode provides a marginally lower level of duplicate keys than the much larger SLA group. However, it halves the number of linked records. In choosing SLA group it has been assumed that the postcode variable is too stringent a linkage requirement as it does not allow for slight errors in postcode. In addition, using SLA group facilitates linking records in cases where people enter hospital while being a permanent resident of a residential aged care service.

- The inclusion in the linkage key of a geographic indicator finer than state is not as critical for the states with relatively small populations (Western Australia and smaller) as it is for the larger states. This is because of the smaller number of people involved. For very small states, like Tasmania, the linked sample is quite small, thereby limiting the type of analyses that can be undertaken at the state level.

- While there may be cases where people do not go straight from hospital to residential aged care, allowing hospital separations to be linked with admissions up to 3 days after the separation date increases uncertainty in the validity of identified linkages without greatly increasing the utility of the resulting linked data set.

Using date of birth, sex, exact separation date/admission date and SLA group of usual residence, the linkage strategy generated just over 9,900 linked records for use in cross-sectoral analysis for NSW and ACT. Just over 99% of these records had unique linkage keys. In addition, marital status from the two source data extracts matched in 89% of cases. These findings further support the use of the linkage strategy.

Analytical potential

From the hospital morbidity database, information is available on such matters as patient characteristics, hospital sector, episode type, diagnoses, procedures, Diagnosis Related Group (DRG), and length of stay. The residential aged care data contains information on client characteristics, care needs (via the Resident Classification Scale), and length of stay. In analysis of the combined data the relationship between hospital episodes and residential aged care can be examined. Using the 1999–00 NSW/ACT linked data, some examples of the types of analyses that can be undertaken are presented. Examples incorporating information from other data sources, such as average DRG costs, and residential aged care provision ratios, are also included. While indicative only, the face validity of the results also demonstrate the utility of the linkage strategy.

Data development

Analysis of linked data indicates that the current 'mode of separation' data item in the hospital morbidity collection does not provide reliable information on where the patient went following separation from hospital. In addition, the creation of a new variable in the residential aged care collection which indicates where the resident has been admitted from would also provide greatly improved information on client flows between the two sectors. As part of this report the Institute has therefore developed draft data definitions for both of the above items for consideration. Procedures for their implementation are also discussed.

Implementation of these items would:

(i)   provide greatly improved information on the size of client flows between the two sectors; and

(ii)   facilitate statistical linkage by allowing more accurate targeting of the linkage process.

Recommendations

Statistical linkage potential

- Additional validation of the linkage strategy is desirable to provide further confirmation of its utility. If cooperation between Western Australia and the AIHW can be achieved, the accuracy of the linkage strategy can be tested against a 'named' database.

- The linkage strategy using date of birth, sex, exact separation date/admission date and SLA group of usual residence can be used to provide linked data sets to undertake analysis of the interface between hospitals and aged care services. Permission to use data from Victoria and the Northern Territory, and checking that the data necessary for linkage is available in those jurisdictions, is required before national analyses can be undertaken.

Data development issues

There is a general need in the health and aged care systems to recognise the importance of including data items in administrative collections that provide information on program interfaces and also provide indicators of system level performance. The task of providing data at a system level is complex and incremental steps toward that objective should be recognised and where possible implemented.

Next steps—short to medium term

- As an important first step toward improving national information on the movements of clients between the residential and acute care sectors, the two data items 'mode of separation' (from hospital), and 'accommodation setting prior to admission to residential aged care' as presented in this report should be implemented. Implementation would require the approval of the National Health Data Committee and the National Health Information Management Group, and consultation with the National Community Services Data Committee.

- The next step would be a more detailed review of the hospital morbidity and residential aged care data sets with a view to identifying additional data developments that would improve the data sets' capacity to report on program interfaces and on system level performance.

Next steps—longer term

- A linkage strategy including name, or incorporating a name-based key such as the HACC (Home and Community Care) linkage key, may provide a preferred basis for linkage in the longer term, and attention should be directed towards developing such a capacity. Such a development could also be used to link hospital episodes for people within the hospital sector. However, as in the current study, in any refinement of the linkage process probabilistic matching procedures should be used rather than deterministic methods.

- Many of the issues described above apply to the interface with the community sector (HACC, Community Aged Care Packages) and 'step down' services, and attention should also be directed towards the implications for linkage of data sets across these programs.

1 Context

1.1 Background

The interface between acute hospital care and residential aged care has long been recognised as an important issue in aged care services research. Changes in both acute and residential aged care systems over the last decade, compounded by the ageing of the aged population, have led to these issues assuming even greater prominence in policy documents and debates in the 21st century. Length of stay in acute care hospitals has decreased. At the same time residential aged care provision has not increased at the same rate as the increase in the frail aged population, as government policy shifted patterns of provision in favour of expanded care in the community. Taken together, these trends have led to a more broadly based recognition of the need to improve the interface between acute hospital care, community care and residential aged care in order to ensure that older people receive the most appropriate care.

Despite general recognition of the importance of the relationships between the various care sectors, existing national data provide very poor information on the movement of clients between the residential and acute care sectors. This is not surprising as administrative by-product collections have historically only been designed with regard to the specific program or sub-program which they describe, rather than to provide information on program interfaces or system level information.

1.2 AIHW feasibility study

In 2001, the Australian Institute of Health and Welfare (AIHW) independently commenced work on a project aimed at exploring the interface between residential aged care services and the acute hospital sector. The aim was to explore the feasibility and utility of using existing national data collections in addressing these key policy issues. The approach adopted involved the creation of linked databases, undertaken on a probabilistic basis, drawing data from both the national hospital morbidity collection and the residential aged care collection. While linkage which includes letters of name (as in the case, for example, of the HACC—Home and Community Care—linkage key), or name itself, is the preferred basis on which to create such a database, the currently held hospital morbidity database does not include such data.

The AIHW therefore undertook a preliminary investigation into the feasibility and utility of linking the two databases using a linkage strategy which did not include letters of name. The variables initially proposed for that linkage were date of birth, postcode, sex, and the date of separation from acute care and admission to residential

aged care.[1] A series of tests were undertaken to examine the validity and utility of such a linkage process, and several versions of the linkage key were explored. This process was, however, complicated by the fact that no 'gold standard' linked data set exists against which the results obtained using this linkage process could be tested.

1.3 AHMAC Care of Older Australians Working Group

Outside the AIHW, the recognition of the need to improve the interface between acute hospital care, community care and residential aged care for older people led to the establishment of the Care of Older Australians Working Group by the Australian Health Ministers' Advisory Council (AHMAC). This Working Group developed a substantial work program during 2001.

Late in 2001, the AIHW agreed that the feasibility study being undertaken within the Institute would proceed during 2002 under the auspices of the Care of Older Australians Working Group. It was agreed that the project was directly relevant to the 'Data needs' component of the AHMAC Working Group's work plan, and that the support and expertise of the Working Group would facilitate the timely completion of the feasibility study. This report has been prepared as part of that agreement, and presents preliminary results of the tests which have been undertaken to explore the validity of the AIHW linkage strategy.

2 Aims

This report:

- Provides preliminary information on the feasibility of linking the national databases using data drawn from New South Wales and the Australian Capital Territory;

- Tests the face validity of the linked database using available alternative data sources and data items;

- Provides example analyses to illustrate how the linked data could be used to inform debate;

- Develops two data items—one new and one a modification of a current data item—which, if implemented, would facilitate the linkage process and improve the capacity of national databases to track the flow of clients between the acute and residential aged care systems.

Results from applying the linkage strategy to data for Western Australia, South Australia and Tasmania are also presented.

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[1] Agreement was obtained from several state and territory departments and from the AIHW Ethics Committee for the hospital morbidity data to be used for the purposes of this study.

3 The linkage strategy

3.1 The linkage variables

The absence of patient names (or a linkage key incorporating part of name) in the AIHW national hospital morbidity data precluded data linkage on this basis. The central hypothesis being tested in this project is whether a linkage key based on variables which include neither name nor part of name can provide a sufficiently robust linkage key to generate a useable linked database on individuals who move from the hospital to the residential care sector, as well as in the reverse direction. While the relevance of people moving from community care to and from both hospital and residential care sectors is recognised by the project team, the community care sector is beyond the scope of the present feasibility study.

The variables proposed for the data linkage process were:

- *Date of birth* (day, month and year).
- *Sex*.
- A *geographic indicator* of the client's place of usual residence prior to admission. One important advantage of including a geographic variable is that it facilitates all-of-Australia analysis, allowing examination of cross-border issues. Two geographic indicators were considered: postcode and Statistical Local Area (SLA).
- *Date of separation* from hospital care matched to the *date of admission* to residential aged care. To allow for slight inaccuracies in recording dates and/or for a small gap between hospital separation and admission into residential aged care both exact separation/admission date matches and admission date within 3 days of separation date were tested.

3.2 The linkage process

The matching between hospital discharge and aged-care admission data was undertaken using a probabilistic record linkage package called *Integrity*. In the first phase of the process the data were blocked using date of birth and sex. The blocking phase limits the number of records being compared and increases the efficiency of the matching. During this blocking phase, all records with the same date of birth and sex were made eligible for comparison.

In the second phase, the program compares records within each block based on date of separation from hospital and admission into a residential aged care service. It was decided to test the effect on number and accuracy of matches of allowing both exact and inexact date of separation from hospital/date of admission to residential care pairs. The range tested was from an exact match on day of separation/day of admission through to date of admission into an aged-care facility being up to 3 days after date of separation from hospital.

The fourth variable, a geographic indicator of place of usual residence, was included using SAS programming within the linked database, rather than using the *Integrity* data linkage package.

3.3 The data

Initially, a combination of New South Wales and the Australian Capital Territory data was used for testing the feasibility of the linkage process (denoted NSW/ACT in the remainder of the report). As a large state, New South Wales generates a large number of client records, and the Australian Capital Territory was included because the catchment area for hospital use in the Australian Capital Territory includes the surrounding rural areas of New South Wales.

Extracts were taken from the two databases being used to test the linkage strategy. Both were limited to people aged 65 or more.

The hospital morbidity extract

The extract of hospital separations for those aged 65 years and above from the hospital morbidity data included both public and private hospital separations and contained data on demographic information, length of stay, diagnoses and procedures. Postcode and SLA of the patient's usual residence prior to admission were also included. Note that for patients coming to hospital from a residential aged care facility where they are permanent residents, the residential aged care service is considered to be their usual residence. A full list of variables is presented in Appendix 5.

To reduce as much as possible the number of mismatches between the two data sets certain hospital separations were excluded from the hospital morbidity extract:

- Deaths: as the purpose of the exercise was to obtain linked data for people moving from hospital to residential aged care, records for those who died in hospital were excluded from the analysis. While there are issues about the quality and utility of the mode of separation variable in the hospital morbidity database (see Section 5.1), it was decided that the death category could be taken as reasonably accurate.

- Statistical discharges: in a 'statistical discharge' the person in question changes from one episode service type to another (e.g. acute care to rehabilitation). As these people do not leave the hospital, trying to link to a residential aged care admission was not appropriate, so separation records relating to statistical discharges were excluded.

- 1st January birthdays: earlier analyses had shown that there was a substantially larger number of records with a 1st January birth date than expected—almost double the average number. Anecdotally, this is the date of birth used when actual date of birth is not known. This group of records was therefore excluded, as the use of this date is an indicator of poor data quality and likely to result in

incorrect matching. This, however, led to the exclusion of some valid new year birthdays.

- Same day hospital admission and separation: people admitted and discharged on the same day are unlikely to be discharged to a residential aged care facility unless they are going from a residential aged care facility to a hospital for a day procedure. In this case the person is unlikely to be recorded as an admission by the residential aged care facility. Therefore to avoid spurious matches between aged care admissions and hospital separations into the community, records with the same admission and separation dates were excluded.

For 1999–00, after taking into account the above exclusions, in New South Wales and the Australian Capital Territory 328,220 hospital separations for those aged 65 and over were extracted for analysis (Table A35).

The residential aged care extract

The extract from the residential aged care data included demographic data, details of place and time of assessment prior to entry, type of entry record, demographic data and resident characteristics related to the Resident Classification Scale (that is, dependency). In addition, postcode of usual residence prior to admission was included. A variable was also created to identify multiple entries to residential aged care for the same person during the study period. In order to maximise the capture of movements from hospital to residential aged care, the residential aged care data extract included not only permanent admissions, but also respite care admissions and residents returning from hospital leave.[2] A full list of variables is presented in Appendix 5.

Admissions relating to people born on the 1st of January were excluded from the residential aged care data extract to mirror the exclusion applied to hospital separations as these admissions could never be matched to the hospital extract data.

For 1999–00 in New South Wales and the Australian Capital Territory, the number of residential aged care admissions extracted from the database for analysis was 32,870. These entries were for people aged 65 or more and included permanent admissions, respite admissions and permanent residents returning from hospital leave (Table 1).

4 Testing the feasibility of the linkage strategy

In the discussion below the combination of variables being used to identify individual records is called the linkage key; for example a linkage key could consist of date of birth, sex, postcode of usual residence and exact date of separation/admission. A unique linkage key is one where there is only one instance of the specific combination of variables on the database; for example, using a linkage

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[2] Preliminary analyses had revealed that the numbers of patients recorded as discharged from hospital to nursing homes was approximately double the number of permanent residential aged care admissions for the same time period.

key consisting of date of birth, sex, postcode of usual residence and exact date of separation/admission, if there is only one case on the database where a man was born on 14 March 1935, with usual residence postcode 2617, and a hospital separation date/residential aged care admission date of 17 July 1999 then this is a unique linkage key. A non-unique key (termed a 'duplicate') is one where more than one record on the database contains a specific combination of the variables in the linkage key. As the proportion of non-unique linkage keys increases, then the validity of the linkage process necessarily decreases.

Analyses were undertaken to establish the proportion of records with a unique linkage key in the residential aged care database, the hospital morbidity database, and the linked database, on the basis of various combinations of the proposed linkage variables. In the analyses it has been assumed that each record in an extract relates to a different separation (in the case of hospitals) or admission (in the case of residential aged care).

4.1 Unique linkage keys in the residential aged care data

The residential aged care database contains unique numerical identifiers for individuals which allow the analysis of these data at both the record and resident level. Residents have more than one record (i.e. more than one entry) if they entered a residential aged care service more than once during the 12 month study period, for example a permanent admission followed by a return from hospital leave, or a respite admission followed by a permanent admission. Analysis of the proportion of unique linkage keys was undertaken at the record level since the current project is primarily concerned with the movement of people between sectors and not their care histories. In addition, the hospital morbidity data does not support analysis by person.

The results using four different linkage keys are presented in Table 1. In the first half of the table, admission dates were matched only if they were exactly the same; in the second half they were matched if they occurred within a 3 day period.[3]

Using date of birth, sex and exact date of admission for the linkage key, 99.0% of residential aged care records (32,540) had unique keys. Adding postcode of usual residence prior to admission to the linkage key increased this proportion to 99.9%. The table also shows the breakdown of these results within the three categories of residents entering residential care—permanent entries, respite entries and return from hospital leave entries.

As expected, allowing matching of admission dates if they were within 3 days of each other reduced the accuracy of the linkage keys compared with allowing only same date of admission. However, the level of duplicates was still quite small for this

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[3] Because the proportion of admissions with unique keys was very high, even without including a geographic indicator, only postcode was used in this analysis. If SLA were to be substituted for postcode, the proportion with unique linkage keys would be between those for the linkage keys with and without postcode.

data set. Using date of birth, sex and admission dates within 3 days as the linkage key, the proportion of unique keys was 97.0%. Again, adding postcode increased the accuracy, with the proportion of unique keys increasing to 99.5%.

These results show that a linkage key based on date of birth, sex and admission date is very good at identifying individual admissions to residential aged care. As expected, adding a geographical element increased the already high accuracy of the linkage key. However, if exact admission date is used (and assuming that it is accurately reported), a geographic dimension is not required for identifying cases within the NSW/ACT residential aged care data set.

Table 1: Duplicates in the residential aged care extract using different linkage keys, by type of resident, NSW/ACT, 1999–00 (admissions, number and per cent)

Linkage key	Permanent	Respite	Leave	All	Permanent	Respite	Leave	All
Exact date		**Number**				**Per cent**		
Linkage key = Date of birth, sex and admission date								
Unique	14,851	14,243	3,634	32,540	99.5	99.5	100.0	99.0
2	68	74	—	330	0.5	0.5	—	1.0
All	**14,919**	**14,317**	**3,634**	**32,870**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex, admission date and postcode								
Unique	14,917	14,309	3,634	32,832	100.0	99.9	100.0	99.9
2	2	8	—	38	0.0	0.1	—	0.1
All	**14,919**	**14,317**	**3,634**	**32,870**	**100.0**	**100.0**	**100.0**	**100.0**
Within 3 days								
Linkage key = Date of birth, sex and admission date								
Unique	14,746	14,146	3,617	31,881	98.8	98.8	99.5	97.0
2	172	170	17	973	1.2	1.2	0.5	3.0
3	1	1	—	16	0.0	0.0	—	0.1
All	**14,919**	**14,317**	**3,634**	**32,870**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex, admission date and postcode								
Unique	14,917	14,308	3,622	32,692	100.0	99.9	99.7	99.5
2	2	9	12	176	0.0	0.1	0.3	0.5
3	—	—	—	2	—	—	—	0.0
All	**14,919**	**14,317**	**3,634**	**32,870**	**100.0**	**100.0**	**100.0**	**100.0**

Note: Duplicates among 'All' records include cases with the same linkage key but a different type of resident. Consequently the number of unique linkage keys among 'All' records is smaller than the sum of duplicates in the three resident types.

4.2 Unique linkage keys in the hospital morbidity data

Hospital separation data are episode based, and (unlike the residential aged care database) it was not possible to identify multiple hospital separations for individuals within the study period. The analysis of the proportion of unique records was therefore undertaken at the record (i.e. separation) level.

The proportion of unique linkage keys in the hospital morbidity data based on date of birth, sex and date of separation within 3 days was relatively low at 80.8% (Table 2). This result was quite different from that reported for the residential aged care data, with the difference being the result of the substantial difference in the size of the two data sets (328,220 hospital separations versus 32,870 residential aged care admissions). When the date of separation criterion was tightened so that an exact (i.e. same day) match was required, the proportion of unique linkage keys increased substantially to 94.4% (or 309,910 records).

Adding a geographic linkage variable

Adding postcode of usual residence to the linkage requirements increased substantially the proportion of unique linkage keys. With regard to date of birth, sex and date of separation within 3 days, adding postcode of usual residence increased the proportion of unique keys from 80.8% to 99.1% (Table 2). Using the tighter requirement of an exact day match for date of separation, the proportion of unique records increased from 94.4% to 99.8% with the addition of the geographic variable.

In the last third of Table 2, SLA was substituted for postcode. SLA is in most cases a broader geographic area than postcode and, therefore, when linking across data sets, reduces the likelihood of missed matches due to slight errors in recording postcode (e.g. recording 2614 instead of 2615). On the other hand, it is a less stringent test for matching than postcode since it is more likely to lead to the same linkage key for different separations. Consequently, it is more likely to produce false matches than matching by postcode. Furthermore, in the hospital morbidity data the SLA of a patient's usual residence is derived from either postcode or SLA information, depending on what is available.[4] This may lead to either missed matches or false matches if a patient is assigned to the wrong SLA for their usual residence.

The results when SLA is included reflect these expectations. With regard to date of birth, sex and date of separation within 3 days, the proportion of unique linkage keys was 97.8%—higher than that without a geographical variable, but slightly lower than that for postcode. Using the tighter requirement of an exact day match for date of separation, the proportion of unique records was 99.6%, again an improvement on the 94.4% achieved with no geographical indicator, but only marginally less than that achieved with postcode (99.8%).

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[4] In the analysis for this section SLA has been derived from postcode or SLA data provided for the hospital morbidity data, depending on which information was available and where the SLA data may relate to out-of-date SLA boundaries. Postcodes and SLAs from previous versions are assigned to current SLAs with probability equal to the proportion of the postcode's, or old SLA's, population that live within a particular current SLA.

Table 2: Duplicates in the hospital morbidity extract using different linkage keys, NSW/ACT, 1999–00 (separations)

Number of duplicates	Date of birth and sex only		Date of birth, sex and postcode		Date of birth, sex and SLA	
	Exact day	Within 3 days	Exact day	Within 3 days	Exact date	Within 3 days
Number						
Unique	309,910	265,053	327,688	325,116	327,021	320,954
2	17,602	55,333	532	3,051	1,196	7,108
3	696	7,093		53	3	156
4	12	666	—	—	—	2
5	—	68	—	—	—	—
6	—	7	—	—	—	-
All	**328,220**	**328,220**	**328,220**	**328,220**	**328,220**	**328,220**
Per cent						
Unique	94.4	80.8	99.8	99.1	99.6	97.8
2	5.4	16.9	0.2	0.9	0.4	2.2
3	0.2	2.2	—	0.0	0.0	0.0
4	0.0	0.2	—	—	—	0.0
5	—	0.0	—	—	—	—
6	—	0.0	—	—	—	—
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Note: SLA is derived from postcode and SLA data provided in the hospital morbidity data—see footnote 4.

The effect of age

The proportion of linkage keys that are unique increases with age, although this effect is dependent on the linkage mechanism used. The age-related trend is of potential relevance given that most residential aged care admissions are at advanced ages: in 1999–00, 85% of persons aged 65 and over admitted to residential aged care (permanent and respite) were aged over 75 (Table A1).

For any linkage key, the potential for duplicate keys decreases with the size of the population being examined. Thus the proportion of patients of the same sex with the same date of birth decreases with age because the number of patients in a particular age group decreases with age (see Table 3 and Table A8). Consequently, using date of birth, sex and exact date of separation, the proportion of unique linkage keys increased from between 93% and 95% in the age groups between 65 to 84 years, to 96.1% in the 85 to 89 age group, and to 99.4% in the 95 and over age group (Table 3).

When postcode was added to the matching requirement, the effect essentially disappeared, with the proportion of unique keys being 99.8% or more for all ages. This is because the groups of keys for comparison were so small that duplicate keys were highly unlikely. Similarly when SLA was substituted for postcode, there was no age-related trend, with the proportion of linkage keys that were unique varying between 99.6% and 99.8%.

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Table 3: The effect of age on the per cent of unique linkage keys in the hospital morbidity data, using different linkage keys, NSW/ACT, 1999–00 (separations)

Linkage key	65–69	70–74	75–79	80–84	85–89	90–94	95+	All
Exact date			Number with unique linkage keys					
Date of birth and sex	57,088	70,224	74,150	56,250	36,107	13,310	2,781	309,910
Date of birth, sex and postcode	60,238	74,806	79,442	59,378	37,511	13,520	2,793	327,688
Date of birth sex and SLA	60,160	74,682	79,230	59,229	37,425	13,508	2,787	327,021
Within 3 days								
Date of birth and sex	48,949	58,541	61,349	48,475	32,385	12,622	2,732	265,053
Date of birth, sex and postcode	59,705	74,176	78,858	58,931	37,235	13,431	2,780	325,116
Date of birth sex and SLA	58,942	73,220	77,768	58,184	36,786	13,300	2,754	320,954
All records	**60,344**	**74,916**	**79,584**	**59,480**	**37,567**	**13,532**	**2,797**	**328,220**
Exact date			Per cent with unique linkage keys					
Date of birth and sex only	94.6	93.7	93.2	94.6	96.1	98.4	99.4	94.4
Date of birth, sex and postcode	99.8	99.9	99.8	99.8	99.9	99.9	99.9	99.8
Date of birth, sex and SLA	99.7	99.7	99.6	99.6	99.6	99.8	99.6	99.6
Within 3 days								
Date of birth and sex only	81.1	78.1	77.1	81.5	86.2	93.3	97.7	80.8
Date of birth, sex and postcode	98.9	99.0	99.1	99.1	99.1	99.3	99.4	99.1
Date of birth, sex and SLA	97.7	97.7	97.7	97.8	97.9	98.3	98.5	97.8

Notes

1. SLA is derived from postcode and SLA data provided in the hospital morbidity data—see footnote 4.

2. See Table A2 for complete data.

The above results indicate that a linkage key based only on date of birth, sex and separation date within 3 days is not sufficient for identifying individual separations from hospital for NSW/ACT. Adding a geographical element increases noticeably the accuracy of the linkage key for both linkages based on exact day separation/admission date matches and those allowing up to 3 days difference: duplicates accounted for less than 3% of records for all keys tested which incorporated a geographical dimension. However, increasing the size of the reference area from postcode to SLA increases only very slightly the incidence of duplicates. If exact separation date is used in conjunction with a geographic dimension the resulting linkage key is very effective in distinguishing between separations.

4.3 Unique keys in the linked database

Examining the proportion of unique records in the linked database is a more complex task than that involved in identifying the proportion within the one data set. The review process must take place in the linked data set in two directions. In other words it is necessary to ask what proportion of hospital morbidity records have been linked to more than one residential aged care record, and then what proportion of

residential aged care records have been linked to more than one hospital morbidity record. By combining the two, the number of non-unique links can then be examined. The results of these analyses are presented in Table 4. It is interesting to note that for linkage keys incorporating a geographic indicator, the number of records in the linked database obtained using the 3 day match was only about 7% more than the number using the exact separation/admission date match.

Proportion of hospital records linked to more than one residential aged care record

On the basis of date of birth, sex, and a date of admission to residential aged care *within 3 days* of hospital separation, 17,749 linked records were obtained (Table 4).[5] Of these, there were 469 instances (2.6%) where a hospital record was linked to more than one residential aged care record. When postcode of usual residence was added to the linkage requirements, the number of linked records dropped to 4,301 and the number of instances where hospital records were linked to more than one residential aged care record fell to 22 (0.2%). When SLA group was substituted for postcode,[6] the number of linked records more than doubled, to 10,570, and the number of instances where hospital records were linked to more than one residential aged care record was 56 (0.5%).

Note that including a geographic indicator in the linkage key means that cases may not be matched if a hospital patient was living permanently in residential aged care immediately prior to hospital admission. In this case the hospital may record the postcode of the residential aged care service as the patient's usual residence, while the residential aged care service will have recorded usual residence based on residence prior to admission into the service. It is quite likely for the residential aged care service to have a different postcode from that recorded as the resident's usual residence prior to admission. However, if people move into a residential aged care service near to their place of residence, then the residential aged care service may well be in the same SLA group as the person's previous residence. In 1999–00 for NSW/ACT, 11% (or 3,634) of admissions to residential aged care were for residents returning from hospital leave (Table 1). This difference in recorded usual residence, and the likelihood of error in recording postcode, accounts for the much higher level of matching when using SLA group rather than postcode in the linkage key.

Linking on the basis of date of birth, sex, and the *same* date of separation/admission resulted in 13,459 linked records. Among these, there were 192 instances (1.4%)

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[5] If a record in one extract links to more than one record in the other extract then the linked data set contains records for each link. For example, one residential aged care admission linking to two hospital separations results in two linked records, and vice versa.

[6] SLA group is based on postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode. Because of this, SLA groups may overlap. Using SLA group overcomes the problems of changing SLA boundaries over time and the inaccuracies associated with the derivation of the SLA of usual residence in the hospital morbidity data (see footnote 4).

where a hospital record was linked to more than one residential aged care record. When postcode was added to the linkage requirements, the number of linked records dropped to 4,051, and the number of instances where hospital records were linked to more than one residential aged care record fell to 8 (0.2%). When SLA group was substituted for postcode, as expected the number of linked records was higher than when using postcode, at 9,922; the number of instances where hospital records were linked to more than one residential aged care record was still small at 14 (0.1%).

Proportion of residential aged care records linked to more than one hospital record

Because there were many more hospital separations included in this study than residential aged care admissions—almost 330,000 compared with 33,000—there are much more likely to be multiple hospital records linking to single residential aged care records than the other way round. Consequently, among the 17,749 linked records resulting from linking on the basis of date of birth, sex, and a date of admission to residential aged care *within 3 days* of hospital separation there were 4,550 instances (25.6%) where a single residential aged care record linked to more than one hospital record (Table 4). Including a geographic dimension to the linkage dramatically reduced the number of multiple links. In particular, using SLA group of usual residence, single residential aged care records were linked to more than one hospital record in only 3.1% of cases (that is for 323 out of 10,570 linked records).

As above, allowing only exact separation/admission date matches reduced the incidence of multiple links to single aged care records. On the basis of date of birth, sex, and the *same* date of separation/admission, 9.2% of links related to single residential aged care records linking to more than one hospital record. Adding SLA group to the linkage key reduced this level of duplication to just 0.8% (78 out of 9,922 records). As would be expected, using postcode rather than SLA group resulted in even fewer multiple links.

From the above it can be seen that most duplicate links are caused by one residential aged care record linking to several hospital records. The number of records in the linked data set that result from a record in one data set linking to more than one in the second data set was quite high if the linkage was not restricted according to geographic area. Even when linking was limited to exact separation/admission date matches, 10.6% of linked records related to multiple matches if the linkage key did not incorporate a geographic indicator (Table 4). Requiring a common SLA group of usual residence reduced the level of duplicate keys in the linked data set to 3.6% using the 3 day separation/admission criterion and to under 1% allowing exact only separation/admission date matches.

Table 4: Duplicates in the linked data using different linkage keys, NSW/ACT, 1999–00

Number of records linking	Exact date match		Within 3 days	
	Number	Per cent	Number	Per cent
Hospital records linked to one residential aged care record				
Linkage key = Date of birth, sex and date of separation/admission				
1	12,224	90.8	13,199	74.4
More than 1	1,235	9.2	4,550	25.6
Total	*13,459*	*100.0*	*17,749*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and postcode				
1	4,019	99.2	4,223	98.2
More than 1	32	0.8	78	1.8
Total	*4,051*	*100.0*	*4,301*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
1	9,844	99.2	10,247	96.9
More than 1	78	0.8	323	3.1
Total	*9,922*	*100.0*	*10,570*	*100.0*
Residential aged care records linked to one hospital record				
Linkage key = Date of birth, sex and date of separation/admission				
1	13,267	98.6	17,280	97.7
More than 1	192	1.4	469	2.6
Total	*13,459*	*100.0*	*17,749*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and postcode				
1	4,043	99.8	4,279	99.5
More than 1	8	0.2	22	0.2
Total	*4,051*	*100.0*	*4,301*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
1	9,908	99.9	10,514	99.5
More than 1	14	0.1	56	0.5
Total	*9,922*	*100.0*	*10,570*	*100.0*
All duplicates				
Linkage key = Date of birth, sex and date of separation/admission				
Unique links	12,032	89.4	12,730	72.1
Non-unique links	1,427	10.6	5,019	27.9
Total	**13,459**	**100.0**	**17,749**	**100.0**
Linkage key = Date of birth, sex and date of separation/admission and postcode				
Unique links	4,011	99.0	4,201	98.0
Non-unique links	40	1.0	100	2.0
Total	**4,051**	**100.0**	**4,301**	**100.0**
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
Unique links	9,830	99.1	10,191	96.4
Non-unique links	92	0.9	379	3.6
Total	**9,922**	**100.0**	**10,570**	**100.0**

Note: If a record in one extract links to more than one record in the other extract then the linked database contains records for each link. For example, one residential aged care admission linking to two hospital separations results in two linked records, and vice versa.

The effect of age

As for the morbidity database, in the linked database the proportion of unique records tended to increase with age. On the basis of date of birth, sex and an admission within 3 days of separation, the percentage of records relating to unique linkage keys increased from 64.9% in the 70–74 age group, to 69.0% in the 80–84 age group, and to 93.9% in the 95 and over age group (Table 5). When an exact match on separation/admission date was used, the proportion of records with unique linkage keys increased from around 86% in the age groups under 80 years, to 88.5% in the 80–84 age group, and to 97.0% in the 95 and over age group.

The above age effect virtually disappeared when postcode of usual residence was added to the linkage key because of the very high proportion of unique records in this matched group. However, when SLA group was used rather than postcode a small effect was still observed, with the trend being more noticeable if the 3 day match was used in the linkage key rather than exact date.

4.4 Summary

Overall, for the linkage keys tested, the relatively small number of duplicate linkage keys in both the two data extracts and in the linked data set when a geographic dimension was included, suggests that the proposed linkage strategy can provide a sample of linked client records which could successfully be used to examine the association between resident characteristics, diagnostic and episode variables, and length of stay in the hospital sector. However, restrictions applied when extracting the data sets, uncertainty in a proportion of the linkages due to duplicate linkage keys and inaccuracies in some of the linkage key variables, especially in the geographic variables, mean that the resulting linked data set should not be used for estimating the volume of client flows at this stage.

Table 5: The effect of age on the per cent of unique linkage keys in the linked data, using different linkage keys, NSW/ACT, 1999–00 (linked records)

Linkage key	65–69	70–74	75–79	80–84	85–89	90–94	95+	Total
Exact date				Number with unique linkage keys				
Date of birth and sex	589	1,202	2,305	3,046	2,964	1,540	386	12,032
Date of birth, sex and postcode	172	391	730	1,005	1,032	536	145	4,011
Date of birth, sex and SLA group	473	934	1,849	2,467	2,477	1,296	334	9,830
Within 3 days								
Date of birth and sex	638	1,295	2,471	3,232	3,101	1,595	398	12,730
Date of birth, sex and postcode	184	411	760	1,056	1,078	560	152	4,201
Date of birth, sex, and SLA group	497	966	1,923	2,564	2,546	1,350	345	10,191
Exact date				Total number of linked records				
Date of birth and sex	679	1,393	2,694	3,442	3,258	1,595	398	13,459
Date of birth, sex and postcode	180	397	734	1,015	1,040	538	147	4,051
Date of birth, sex and SLA group	485	946	1,873	2,487	2,493	1,300	338	9,922
Within 3 days								
Date of birth and sex	892	1,996	3,803	4,684	4,116	1,834	424	17,749
Date of birth, sex and postcode	192	425	774	1,086	1,098	572	154	4,301
Date of birth, sex and SLA group	521	1,017	2,000	2,662	2,633	1,386	351	10,570
Exact date				Per cent with unique linkage keys				
Date of birth and sex	86.7	86.3	85.6	88.5	91.0	96.6	97.0	89.4
Date of birth, sex, and postcode	95.6	98.5	99.5	99.0	99.2	99.6	98.6	99.0
Date of birth, sex and SLA group	97.5	98.7	98.7	99.2	99.4	99.7	98.8	99.1
Within 3 days								
Date of birth and sex	71.5	64.9	65.0	69.0	75.3	87.0	93.9	71.7
Date of birth, sex and postcode	95.8	96.7	98.2	97.2	98.2	97.9	98.7	97.7
Date of birth and sex, and SLA group	95.4	95.0	96.2	96.3	96.7	97.4	98.3	96.4

5 Validation of linkages using other variables

It is not currently possible to validate the above linkage strategy by comparing results with a data set where the exact links between clients of hospital and residential aged care services are known. In the future this may be possible if hospital morbidity data with information on client name for one state, say, can be obtained to compare with residential aged care data with name. Collaboration between Western Australia and AIHW is currently being investigated, with a view to developing such a data set. However, in the mean time some validation can be undertaken by looking at the consistency of client characteristics in the two source data sets for the linked records.

5.1 Mode of separation from hospital

The hospital morbidity database contains a variable, mode of separation, which indicates the destination of people after they leave the hospital. Intuitively, it would seem that this variable could be used either as part of the linkage process itself (to positively identify those people who leave hospital and enter residential aged care) or to check on the quality of the linkage process. However, the mode of separation variable does not, in practice, clearly identify which people who separate from the hospital enter residential aged care.

The main problem with this data item from the perspective of this project is that persons for whom a residential aged care service is their 'usual place of residence' are, according to the *National Health Data Dictionary*, coded to the mode of separation category 'other'. The code for residential aged care service is to be used when this is not their usual place of residence prior to hospital entry. The picture provided by this data item is further clouded by the fact that the terms 'nursing home' and 'hostel' were only replaced with 'residential aged care service' in the 2001 version of the data dictionary. Allowing some time for implementation of those changes in hospital systems, it is reasonable to assume that hospitals were still using the previous definition at least until 2001. In the earlier definition, separation to a nursing home (again except where it was the usual place of residence) had a distinct code, but separation to a hostel was included under the category of 'other health care accommodation'.

In this project we are using 1999–00 data, and so the new codes for mode of separation were not yet being used for the hospital morbidity data. Hence, persons moving from a hospital to an aged care service could receive a code of 2 (nursing home), 4 (other health care accommodation) or 9 (other, which includes discharge to usual residence—usually within the general community).

Table 6 shows the distribution of the mode of separation variable in the linked data, the unlinked or 'residual' hospital data, and all hospital data. The linkage keys in use in this table are based on date of birth, sex and exact date of separation/admission. The effect of adding SLA group of usual residence to the key is also shown.

Without including a geographic indicator this linkage process picked up 45.1% of those separations coded as being discharged to a 'nursing home', 25.7% of those coded as being discharged to 'other health care accommodation', and 2.0% of those coded as 'other'. While this latter percentage appears small, it reflects the fact that most people return to the community after visiting hospital. The actual numbers associated with these three percentages are also relevant—6,707 of the linked entries were coded to the 'nursing home' category, 529 to 'other health care accommodation' and 5,674 to 'other'. Consequently, overall 50.2% of the linked records had their separation mode recorded as 'nursing home', 4.0% had 'to other health care accommodation' and 42.5% had 'other' separation modes. If the return from leave records are excluded from the comparison (as they should be coded to 'other' if coded correctly) the percentage of linked records indicating separation to a nursing home increased to 54.6%.

Looking solely at the unlinked hospital data, only 2.6% of records were coded as leaving for a nursing home while the vast majority—87.1%—had 'other' as the separation mode. While 2.6% being coded as 'to nursing home' is a small percentage, in numerical terms it is quite significant, representing 8,167 cases. This is a significant number when compared with the total number of linked records identified in the hospital data as going to nursing homes (6,707 as given above). The discrepancy here appears to be the result of problems with recording mode of separation. From Table 1, in 1999–00 there were almost 33,000 admissions (after exclusions for this study). In general, it has been estimated by government analysts that between 40% and 60% of admissions to residential aged care services are from hospitals, with the remainder being from the community. Therefore, for 1999–00 we would have expected between about 13,200 and 19,800 admissions from hospitals. The number of hospital separations coded as going to nursing homes is within this range (14,874). However, this figure does not include those going to what were previously termed 'hostels' or those returning to an aged care service after a stay in hospital (on hospital leave).

Turning to the linked data, it is consistent with the recommended coding practice that the linkage strategy would pick up persons with all three of these modes of separation. However, those in the 'other' category should, if coded correctly, only refer to residents returning from leave. While there were 2,637 return from hospital leave linked entries, only 1,675 (64.7%) were coded to the correct separation mode of 'other' (although a further 32.2% were coded to nursing home). While this error could lie in the linkage process, given that it is known the person has entered the residential aged care service from a hospital, the reliance that can be placed on this aspect of the linked database is quite high. It is also of concern that the linkage strategy is picking up 436 separations (3.3% of the linked records) coded as going to another hospital, although some hospitals do contain funded residential aged care services, so the linkage in these cases may be legitimate.

Similar results were obtained when SLA group was added to the linkage key. However, as would be expected from a more rigorous linkage key, the proportion of linked records with separation mode 'to nursing home' was higher (56.2%) while the proportion coded to 'other' was lower (36.9%).

Allowing separation and admission dates to be within 3 days led to similar results, although smaller percentages of linked residential aged care admissions had been identified as going to a nursing home by the hospital (Table A3). Overall, these results suggest that there are problems with how separation mode is recorded in the hospital morbidity data, and that a better classification which clearly identifies different types of separations to residential aged care needs to be developed.

Table 6: Hospital separation mode for exact date linked data, unlinked hospital data and all hospital data, by linkage key used, NSW/ACT, 1999–00

| Separation mode | Linked data Type of entry to residential aged care | | | | Unlinked hospital data | All hospital data |
	Permanent admissions	Respite admissions	Return from leave	All linked entries		
	Number					
Linkage key = date of birth, sex and exact day						
To another hospital	224	171	41	436	30,028	30,464
To nursing home	4,365	1,493	849	6,707	8,167	14,874
To other health care accommodation	169	290	70	529	1,528	2,057
Unknown	9	6	2	17	1,043	1,060
Other	2,043	1,956	1,675	5,674	274,091	279,765
All	**6,810**	**3,916**	**2,637**	**13,363**	**314,857**	**328,220**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital	128	101	14	243	30,221	30,464
To nursing home	3,729	1,284	562	5,575	9,299	14,874
To other health care accommodation	130	245	52	427	1,630	2,057
Unknown	7	3	1	11	1,049	1,060
Other	1,285	1,219	1,155	3,659	276,106	279,765
All	**5,279**	**2,852**	**1,784**	**9,915**	**318,305**	**328,220**
	Row per cent					
Linkage key = date of birth, sex and exact day						
To another hospital	0.7	0.6	0.1	1.4	98.6	100.0
To nursing home	29.3	10.0	5.7	45.1	54.9	100.0
To other health care accommodation	8.2	14.1	3.4	25.7	74.3	100.0
Unknown	0.8	0.6	0.2	1.6	98.4	100.0
Other	0.7	0.7	0.6	2.0	98.0	100.0
All	**2.1**	**1.2**	**0.8**	**4.1**	**95.9**	**100.0**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital	0.4	0.3	0.0	0.8	99.2	100.0
To nursing home	25.1	8.6	3.8	37.5	62.5	100.0
To other health care accommodation	6.3	11.9	2.5	20.8	79.2	100.0
Unknown	0.7	0.3	0.1	1.0	99.0	100.0
Other	0.5	0.4	0.4	1.3	98.7	100.0
All	**1.6**	**0.9**	**0.5**	**3.0**	**97.0**	**100.0**
	Column per cent					
Linkage key = date of birth, sex and exact day						
To another hospital	3.3	4.4	1.6	3.3	9.5	9.3
To nursing home	64.1	38.1	32.2	50.2	2.6	4.5
To other health care accommodation	2.5	7.4	2.7	4.0	0.5	0.6
Unknown	0.1	0.2	0.1	0.1	0.3	0.3
Other	30.0	49.9	63.5	42.5	87.1	85.2
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital	2.4	3.5	0.8	2.5	9.5	9.3
To nursing home	70.6	45.0	31.5	56.2	2.9	4.5
To other health care accommodation	2.5	8.6	2.9	4.3	0.5	0.6
Unknown	0.1	0.1	0.1	0.1	0.3	0.3
Other	24.3	42.7	64.7	36.9	86.7	85.2
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1.   SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2.   The linked data in this table is based on the number of unique residential aged care records linked; excess links have been excluded.

5.2 Place of assessment for residential aged care admissions

There is unfortunately no variable in the residential aged care database which indicates whether a resident has been admitted from hospital or from elsewhere. The variable which is sometimes used as an indicator of admission from hospital is whether or not the Aged Care Assessment Team's (ACAT) assessment occurred in hospital. This is, of course, a very imperfect indicator, as a person assessed in hospital may, for example, return to the community and enter residential care from their own home, or alternatively he or she may be assessed at home, and enter residential aged care after admission to a hospital as a result of an episode of acute illness. It is therefore recommended that a variable which indicates where the resident has been admitted from be developed.

Regardless of these problems, as it is the only available indicator of location prior to admission the linked data set was examined in relation to this variable (for permanent and respite admissions only, as for those returning from hospital leave the ACAT assessment may have occurred at any time in the past). Using the linked data set produced by the combination of date of birth, sex and exact date of separation/admission, it is evident that the proportion of entries who had had an ACAT assessment in hospital is far higher in the linked data set (73.1%) than in the unlinked data set (20.7%) (Table 7). The corresponding numbers obtained when SLA group of usual residence was added to the linkage process are 77.4% and 24.5%.

Replacing the exact separation/admission date requirement to allowing matches when the admission date was within 3 days of the separation date, led to similar results. As expected, due to the less precise matching requirement, the proportion of linked residential aged care records with assessment taking place in a hospital was slightly lower using the less exact match. For example, 75.8% of linked records gave hospital as the place of assessment when using date of birth, sex, SLA group and admission within 3 days of separation as the linkage key, compared with 77.4% when an exact date match was used (Table A4).

The high proportion of linked records with 'hospital' as the place of assessment is an encouraging finding with regard to the validity of the linkage process.

Table 7: Place of assessment for exact date linked and unlinked residential aged care data, by linkage key used, NSW/ACT, 1999–00

Place of assess-ment	Linked data			Unlinked			All residential aged care data		
	Permanent	Respite	All	Permanent	Respite	All	Permanent	Respite	All
Number									
Linkage key = date of birth, sex and exact date									
Aged care facility	316	184	500	1,089	841	1,930	1,405	1,025	2,430
At home	980	991	1,971	4,322	7,692	12,014	5,302	8,683	13,985
Hospital	5,066	2,475	7,541	2,461	1,454	3,915	7,527	3,929	11,456
Other	183	128	311	502	552	1,054	685	680	1,365
Total	**6,545**	**3,778**	**10,323**	**8,374**	**10,539**	**18,913**	**14,919**	**14,317**	**29,236**
Linkage key = date of birth, sex, exact date and SLA group									
Aged care facility	237	138	375	1,168	887	2,055	1,405	1,025	2,430
At home	698	551	1,249	4,604	8,132	12,736	5,302	8,683	13,985
Hospital	4,194	2,080	6,274	3,333	1,849	5,182	7,527	3,929	11,456
Other	129	79	208	556	601	1,157	685	680	1,365
Total	**5,258**	**2,848**	**8,106**	**9,661**	**11,469**	**21,130**	**14,919**	**14,317**	**29,236**
Per cent									
Linkage key = date of birth, sex and exact date									
Aged care facility	4.8	4.9	4.8	13.0	8.0	10.2	9.4	7.2	8.3
At home	15.0	26.2	19.1	51.6	73.0	63.5	35.5	60.6	47.8
Hospital	77.4	65.5	73.1	29.4	13.8	20.7	50.5	27.4	39.2
Other	2.8	3.4	3.0	6.0	5.2	5.6	4.6	4.7	4.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, exact date and SLA group									
Aged care facility	4.5	4.8	4.6	12.1	7.7	9.7	9.4	7.2	8.3
At home	13.3	19.3	15.4	47.7	70.9	60.3	35.5	60.6	47.8
Hospital	79.8	73.0	77.4	34.5	16.1	24.5	50.5	27.4	39.2
Other	2.5	2.8	2.6	5.8	5.2	5.5	4.6	4.7	4.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2. Admissions to residential aged care relating to hospital leave have been excluded.

3. The linked data in this table is based on the number of unique residential aged care records linked; excess links have been excluded.

5.3 Marital status

Marital status is available in both the hospital morbidity and residential aged care data sets for NSW/ACT. It can therefore provide a quality check on the data linkage results. However, marital status for residential care is collected at the time of initial entry, and therefore may be out of date for some residents, in particular for those returning from hospital leave (or around 20% of linked records—Table 6).

Table 8 presents the results of this comparison for the linked database using the exact day admission/separation variable. There was agreement on marital status in 78% of linked records when date of birth, sex and exact day was used to match, with this increasing to 83% when matching on SLA group of usual residence was incorporated into the linkage key. These percentages are based on all records. However, marital status was unknown for 1% of linked residential aged care records and for 6.1% for the hospital morbidity data. If records with marital status missing are excluded, these proportions become 84% and 89%, respectively. The largest source of disagreement was between the widowed and married categories; it is plausible that some of these would relate to less current record systems in one facility or another, given the advanced age of this group and the reasonably high likelihood of death of a spouse.

Increasing the uncertainty of the link by moving to a 'within 3 days' match on separation and admission dates reduced the above percentages only marginally when SLA group was still included in the linkage key, but more noticeably when the geographic restriction was not included (Table A5). Excluding cases with missing information, the percentages with matching marital status from the two data sources were 89% with SLA group in the linkage key and 77% without SLA group in the key.

Table 8: Comparison of marital status in hospital data and marital status in aged care data by exact date linkage key used, linked data set, NSW/ACT, 1999–00

Residential aged care	Never married	Married including de facto	Widowed	Divorced or separated	Not stated	All
			Hospital morbidity data			
			Number			
Linkage key = date of birth, sex and exact date						
Never married	804	97	155	22	126	1,204
Married including de facto	63	3,057	299	40	124	3,583
Widowed	226	567	6,245	247	525	7,810
Divorced or separated	63	106	151	362	83	765
Unknown	8	18	55	4	12	97
All	**1,164**	**3,845**	**6,905**	**675**	**870**	**13,459**
Linkage key = date of birth, sex, exact date and SLA group						
Never married	657	26	85	9	89	866
Married including de facto	30	2,474	111	18	75	2,708
Widowed	131	248	4,797	188	370	5,734
Divorced or separated	43	42	96	298	61	540
Unknown	6	12	46	2	8	74
All	**867**	**2,802**	**5,135**	**515**	**603**	**9,922**
			Per cent			
Linkage key = date of birth, sex and exact date						
Never married	6.0	0.7	1.2	0.2	0.9	8.9
Married including de facto	0.5	22.7	2.2	0.3	0.9	26.6
Widowed	1.7	4.2	46.4	1.8	3.9	58.0
Divorced or separated	0.5	0.8	1.1	2.7	0.6	5.7
Unknown	0.1	0.1	0.4	0.0	0.1	0.7
All	**8.6**	**28.6**	**51.3**	**5.0**	**6.5**	**100.0**
Linkage key = date of birth, sex, exact date and SLA group						
Never married	6.6	0.3	0.9	0.1	0.9	8.7
Married including de facto	0.3	24.9	1.1	0.2	0.8	27.3
Widowed	1.3	2.5	48.3	1.9	3.7	57.8
Divorced or separated	0.4	0.4	1.0	3.0	0.6	5.4
Unknown	0.1	0.1	0.5	0.0	0.1	0.7
All	**8.7**	**28.2**	**51.8**	**5.2**	**6.1**	**100.0**

Note: SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

5.4 Summary

Validation

The consistency of marital status in the hospital morbidity and residential aged care data sets among linked records, and the consistency of place of assessment among residential aged care records that have been linked to hospital separations indicate that we can have reasonable confidence that, using the proposed linkage strategy, linked records relate to people who have moved between the two sectors. This is especially true if a geographic indicator of place of usual residence is included in the linkage key, as this limits the likelihood of false matches. Inconsistencies in the mode of separation data on the hospital morbidity database with the linkage results, and identified problems with this variable, suggest that it does not provide a very good validation test of the linkage strategy. Moreover, for this variable to be useful either for use in validation or for adding to the accuracy of linkages, a new classification needs to be developed.

Utility of linkage strategy

The above analyses indicate that a linkage strategy based on variables other than name of client could be useful in obtaining a sample of cases showing movement from hospital to residential aged care. Steps taken to reduce the number of false links, however, imply that at this stage the resulting linked data set would not be accurate enough to allow calculation of the flow between the two sectors. This is because reducing the number of false links at the same time increases the number of missed links. There is also potential for biases in the linked data set, primarily due to these missed links. The existence and extent of any biases could be examined by using named hospital and residential aged care data sets to compare results based on the current linkage strategy with those using a named-based strategy.

Among the linkage keys tested, that based on date of birth, sex, exact date of separation/admission and SLA group of usual residence appears to provide a linked data set with high confidence that identified links were correct; that is, that the incidence of false links was small. This data set could be used to examine such matters as the characteristics of people who have long stays in hospital before transferring to residential aged care.

Data development

An important first step towards improving national information on the movements of clients between the residential and acute care sectors would be the revision of the current 'mode of separation' data item in the hospital morbidity collection, and the creation of a new variable in the residential aged care collection which indicates where the resident has come from. To this end, draft data definitions have been developed (see Section 8). Development and implementation of these items would provide greatly improved information on the size of client flows between the two

sectors, and facilitate statistical linkage by providing variables which would allow more accurate targeting of the linkage process.

6 Results for Western Australia, South Australia and Tasmania

In order for the linkage strategy to be useful in a national context, its utility across a number of different states and territories needs to be established. The linkage strategy was therefore also applied to data from Western Australia, South Australia and Tasmania. The tables corresponding to those presented above for NSW/ACT are in Appendix 2 (for Western Australia), Appendix 3 (for South Australia) and Appendix 4 (for Tasmania). The results are summarised below. Unfortunately, although Queensland provided approval for use of the appropriate hospital morbidity data, it was not received in time to allow inclusion in this study. However, Queensland could be included if further analysis were to be carried out using the linked data.

6.1 Unique linkage keys in the unlinked data

As stated above, as the number of records being tested for unique linkage keys decreases, the proportion of records with unique linkage keys increases. Consequently, for each linkage key in both the hospital morbidity and residential aged care data sets the proportion with unique keys was lowest for NSW/ACT and highest for Tasmania. There were few duplicates in the Western Australian, South Australian and Tasmanian data, with the proportion of duplicate keys being less than 2% for all keys incorporating geographic location. (See Table 1 and Table 2 for NSW/ACT, Table A11 and Table A12 for Western Australia, Table A19 and Table A20 for South Australia, and Table A27 and Table A28 for Tasmania).

With respect to different linkage keys, the results for the three states were generally the same as those for NSW/ACT, with linkage keys employing exact dates having fewer duplicates than similar keys using 3 day matches, and with the addition of a geographic indicator of usual residence also reducing the incidence of duplicate keys. Because of the relatively small numbers, an age effect in the number of unique linkage keys was only observed in the hospital data when using the least exact linkage key, that is using a linkage key based on date of birth, sex and separation dates within 3 days. (See Table A13 for Western Australia, Table A21 for South Australia and Table A29 for Tasmania).

6.2 Unique linkage keys in the linked data

As expected, the number of linked records were considerably smaller for Western Australia, South Australia and Tasmania than for NSW/ACT. The resulting samples are shown in Table 9.

For linkage keys based on exact separation/admission date matches, the proportion of unique linkage keys was between 97.1% and 99.3% for Western Australia, between 96.2% and 99.7% for South Australia and between 99.0% and 100.0% for Tasmania. In all three states there was very little difference in the results for linkage keys using postcode of usual residence and the corresponding keys using SLA group of usual residence. (See Table A14 for Western Australia, Table A22 for South Australia and Table A30 for Tasmania).

Table 9: Comparison of the number of records in the linked data sets, by state/territory and linkage key, 1999–00 (number)

State	Linkage key	Number
NSW	Date of birth, sex, exact date	13,459
NSW	Date of birth, sex, exact date, SLA group	9,922
WA	Date of birth, sex, exact date	3,312
WA	Date of birth, sex, exact date, SLA group	2,343
SA	Date of birth, sex, exact date	3,698
SA	Date of birth, sex, exact date, SLA group	2,894
Tas	Date of birth, sex, exact date	602
Tas	Date of birth, sex, exact date, SLA group	484

Sources: Table 8, Table A18, Table A26 and Table A34.

Because of the relatively small numbers involved, once an exact separation/admission date match was required, adding a geographic indicator improved the efficiency of the linkage key only marginally. However, when matches within 3 days were allowed, including postcode or SLA group noticeably reduced the proportion of duplicate keys, especially in the larger states of Western and South Australia. Age effects were again small. (See Table A15 for Western Australia, Table A23 for South Australia and Table A31 for Tasmania).

6.3 Validation

Separation mode

As for NSW/ACT, a large proportion of hospital separations said to be going to a nursing home were not matched to a residential aged care record. The difference was more pronounced in South Australia and Tasmania than in Western Australia. In the South Australian data 65% and 72% of separations 'to a nursing home' were not included in the linked data for the two linkage keys examined. For Tasmania the corresponding numbers were 58% and 66%, while for Western Australia these figures were 39% and 57%, respectively. (For NSW/ACT 55% and 63% of hospital records with separation mode of 'to a nursing home' were not matched to a residential aged care record for the two 'exact date' linkage keys examined). (See Table A16 for Western Australia, Table A24 for South Australia and Table A32 for Tasmania).

Place of assessment

In Western Australia, for both linkage keys examined around 74% of linked records had 'hospital' as the place of assessment for ACAT. For South Australia and Tasmania the corresponding figures were around 71% and 65% (compared with between 73% and 77% for NSW/ACT). As for NSW/ACT, the percentages of unlinked records with 'hospital' as the place of assessment for ACAT were considerably smaller. (See Table A17 for Western Australia, Table A25 for South Australia and Table A33 for Tasmania).

Marital status

Marital status is not collected as part of the National Minimum Data Set (NMDS) for Admitted Patient Care—the source of the hospital morbidity data. It does, however, belong to the NMDS for Admitted Patient Mental Health Care and as such is only required to be reported for patients who have psychiatric care days. Nevertheless some states report marital status.

There were very little data on marital status in both the South Australian and Tasmanian hospital morbidity data: 'hospital' marital status was not given for around 98% of linked records for both states. For Western Australia nearly all linked records had marital status from both data sources, and in 86% of cases the same marital status was given in both data sources (excluding cases with missing data). (See Table A18 for Western Australia, Table A26 for South Australia and Table A34 for Tasmania).

6.4 Summary

The Western Australian, South Australian and Tasmanian results reflect the findings from the NSW/ACT data: that a linkage key based on date of birth, sex, exact separation/admission date and a geographic indicator could provide a sample of linked records for further analysis. However, for these three states the inclusion in the linkage key of a geographic indicator finer than state was not as critical as it was for NSW/ACT. This was because of the smaller number of people involved in these states. For small states like Tasmania the linked sample is quite small, thereby limiting the type of analyses that can be undertaken for that state.

7 Analytical potential: examples[7]

Using date of birth, sex, exact separation date/admission date and SLA group of usual residence, the linkage strategy generated almost 10,000 linked records for use in cross-sectoral analysis for NSW and ACT. Just over 99% of these records had unique linkage keys. This sample of linked records can be used in conjunction with unlinked records from the hospital morbidity and residential aged care databases to illustrate the type of analyses that can be carried out when combined data are available. A number of examples illustrating how the linked data can be used to investigate a range of issues are discussed below. It must be remembered that the examples are illustrative only, and are not intended as a basis for policy or planning.

From the hospital morbidity database, information is available on such matters as patient characteristics, hospital sector, episode type, diagnoses, procedures, DRGs (Diagnosis Related Group),[8] and length of stay. The residential aged care data contains information on client characteristics, ACAT assessment, care needs via the Resident Classification Scale (RCS), and length of stay. In analysis of the combined data the relationship between hospital episodes and residential aged care can be examined. Some examples of the types of analyses that can be undertaken are given below. The examples are quite simple, and are not meant to provide a detailed examination of the links between the hospital and residential aged care sectors. Rather, they point to what is possible and how data can be pulled together.

When carrying out analysis using the sample obtained via the above linkage strategy, several issues concerning the data need to be remembered:

- Due to the constraints used in the linkage strategy not all movements from hospital to residential aged care are included in the linked data. Consequently, the 'unlinked' records will include some records related to movement between the sectors, and so there is the potential for bias in the results. However, given that it is expected that the linked data set contains at least half of all movements from hospital to residential aged care (see Section 5.1) and that there are larger numbers of unlinked records compared with linked records—in both the morbidity and residential aged care data—this 'contamination' should have only a limited effect on the distributions in the 'unlinked' data, and should not affect general trends.

- The exclusion of same-day admissions and separations from the hospital morbidity data leads to a bias towards longer lengths of stay in the hospital data.

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[7] These examples are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

[8] Diagnosis Related Group (DRG) is a patient classification scheme which provides a clinically meaningful way of relating the number and types of patients treated in a hospital to the resources required by the hospital.

Consequently, diagnoses and procedures related to these short stays are under-represented in the hospital data.

- Length of hospital stay relates to hospital episodes rather than the total length of stay for all contiguous episodes of care for a patient. The removal of statistical separations from the hospital morbidity data means that in cases where patients changed episode type in hospital (for example, from acute care to rehabilitation) the length of stay derived for the patient was that for the last episode type before discharge. As with the same-day exclusions, diagnoses and procedures related to statistical discharges are therefore under-represented in the hospital data. In addition, if patients were transferred to another hospital, two hospital stays were recorded.

- Because the analyses presented below are for example only, and are not meant to provide definitive answers to particular questions, duplicates have not been removed from the linked data. Fewer than 1% of linked records were duplicates (Table 4). When used for targeted analysis, duplicates should be removed from the linked data set for greater accuracy.

In addition, in the discussion below the terms 'to the community' and 'from the community' are used to refer to all movements other than those explicitly identified as coming from hospital in the case of movement into residential aged care, or going to residential aged care in the case of movements from hospital. It is acknowledged that a small proportion of movements from hospital may have been to another hospital or other non-aged care facility, and that similarly some movements into a residential aged care service may have been from a non-hospital service.

7.1 General client characteristics

The linked and unlinked data can be used to compare the characteristics of people leaving hospitals with those of people entering residential aged care. Illustration 1 shows the age and sex distribution for people who left hospital and went to residential aged care, entered residential aged care from the community, or left hospital to return to the community.

Overall, the analysis indicates that in NSW/ACT in 1999–00, the gender and age balance of people going into residential aged care was similar whether people were coming from the community (unlinked) or from hospital (linked), although a slightly smaller proportion were men among those coming from the community compared with those coming from hospital (Illustration 1). However, there were differences between those going from hospital to the community and those going into residential aged care. Over 70% of men and 60% of women returning to the community from hospital were aged under 80 years, compared with just over 40% of men and just under 30% of women moving into residential aged care (Figure 1). Also, while women made up around two-thirds of people going into residential aged care, both from hospital and from the community, there was a much more even split between the sexes among those who returned to the community after their episode in hospital (Figure 2). This was due to the younger age profile of people going to the community

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from hospital, as noted above, and the fact that just over 50% of hospital separations for people aged under 80 were for men, while among people over the age of 85 women made up over two-thirds of patients. For people aged from 80 to 84 years, 43% of separations were for men and 57% were for women.
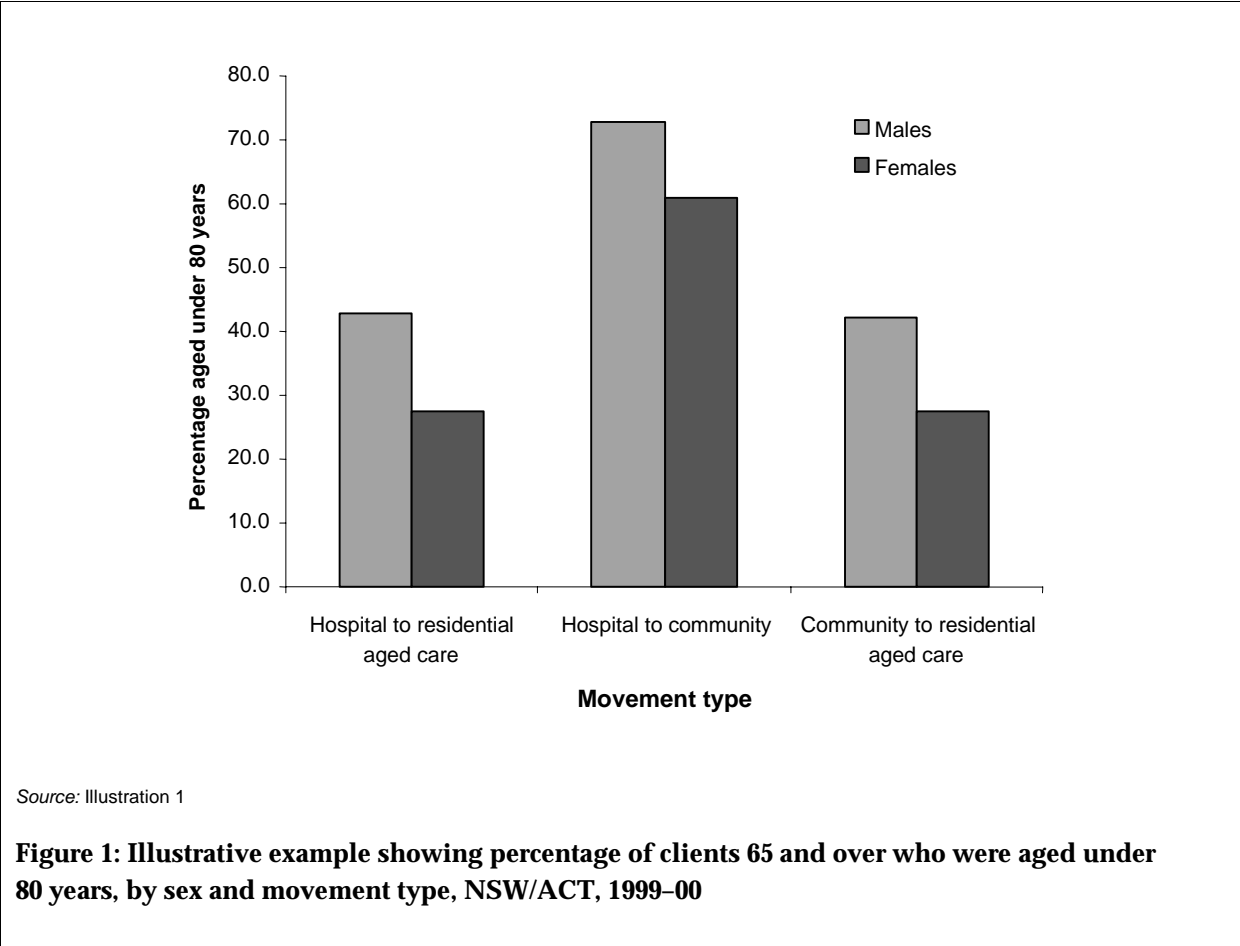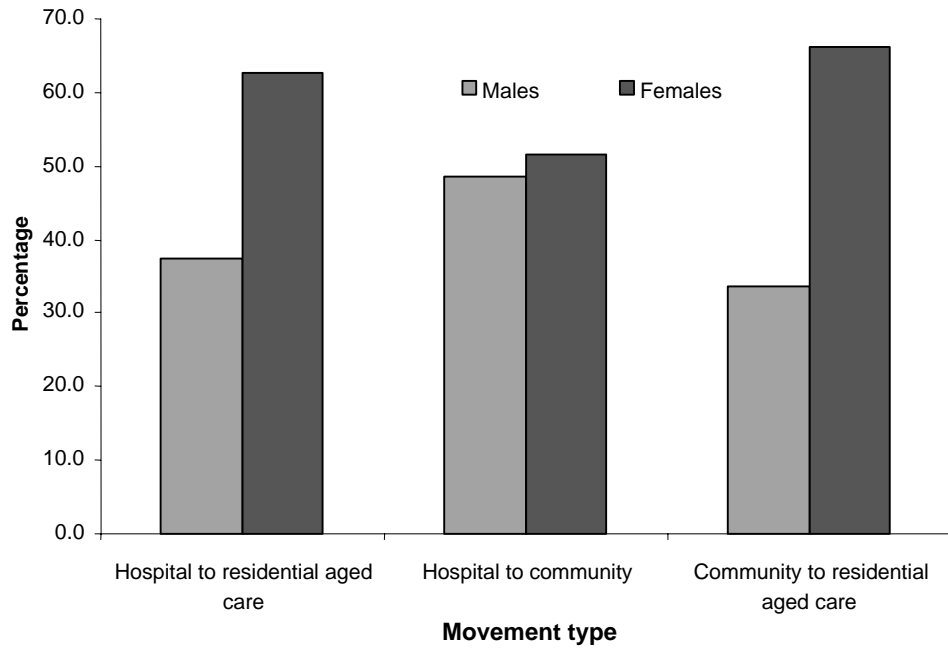
Source: Illustration 1

Figure 1: Illustrative example showing percentage of clients 65 and over who were aged under 80 years, by sex and movement type, NSW/ACT, 1999–00

Figure 2: Illustrative example showing sex of clients moving between sectors, by movement type, NSW/ACT, 1999–00

Illustration 1: Hospital separations and residential aged care admissions: age and sex, by movement type, NSW/ACT, 1999–00

Record type	Sex	Age at hospital separation/residential aged care admission
		65–69	70–74	75–79	80–84	85–89	90–94	95+	All
		**Column per cent**
Hospital to RACS[(a)]	Males	57.5	51.8	43.8	36.7	31.5	27.0	19.9	37.3
	Females	42.5	48.2	56.2	63.3	68.5	73.0	80.1	62.7
	All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Community to RACS[(b)]	Males	50.1	45.0	41.4	32.2	29.2	23.8	18.8	33.7
	Females	49.9	55.0	58.6	67.8	70.8	76.2	81.2	66.3
	All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
All RACS	Males	52.7	47.2	42.2	33.6	29.9	24.9	19.2	34.9
	Females	47.3	52.8	57.8	66.4	70.1	75.1	80.8	65.1
	All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Hospital to community[(c)]	Males	55.5	53.3	50.6	43.7	37.1	30.5	24.7	48.5
	Females	44.5	46.7	49.4	56.3	62.9	69.5	75.3	51.5
	All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
All hospital	Males	55.6	53.3	50.4	43.4	36.7	30.2	24.1	48.2
	Females	44.4	46.7	49.6	56.6	63.3	69.8	75.9	51.8
	All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
		**Row per cent**
Hospital to RACS[(a)]	Males	7.5	13.2	22.2	24.6	21.2	9.5	1.8	100.0
	Females	3.3	7.3	16.9	25.3	27.5	15.3	4.3	100.0
	All	**4.9**	**9.5**	**18.9**	**25.1**	**25.1**	**13.1**	**3.4**	**100.0**
Community to RACS[(b)]	Males	6.8	13.0	22.5	24.7	22.6	8.8	1.7	100.0
	Females	3.4	8.1	16.1	26.5	27.8	14.3	3.8	100.0
	All	**4.5**	**9.7**	**18.3**	**25.9**	**26.0**	**12.4**	**3.1**	**100.0**
All RACS	Males	7.0	13.1	22.4	24.7	22.1	9.0	1.7	100.0
	Females	3.4	7.8	16.4	26.1	27.7	14.6	4.0	100.0
	All	**4.7**	**9.7**	**18.5**	**25.6**	**25.7**	**12.7**	**3.2**	**100.0**
Hospital to community[(c)]	Males	21.7	25.7	25.5	16.0	8.3	2.4	0.4	100.0
	Females	16.4	21.2	23.4	19.5	13.3	5.1	1.1	100.0
	All	**19.0**	**23.4**	**24.4**	**17.8**	**10.9**	**3.8**	**0.8**	**100.0**
All hospital	Males	21.4	25.4	25.4	16.2	8.6	2.6	0.4	100.0
	Females	15.9	20.7	23.2	19.7	13.8	5.5	1.2	100.0
	All	**18.5**	**22.9**	**24.3**	**18.0**	**11.3**	**4.1**	**0.8**	**100.0**

(a) Linked hospital and residential aged care records.

(b) Unlinked residential aged care records.

(c) Unlinked hospital records; includes some cases where patients were transferred to another hospital.

Notes

1. Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

2. These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

7.2 Length of stay in hospital

An important issue concerning movement between the hospital and aged care sector is whether people are staying longer than clinically necessary in hospital due to a scarcity of appropriate residential aged care. A way to start looking at this issue is to examine length of hospital stay for those who leave hospital to go to the community and those who leave to go to residential aged care.

Illustration 2 suggests that in NSW/ACT in 1999–00 patterns of length of stay in hospital were quite different for people who moved to residential aged care on discharge compared with those who returned to the community. Those discharged into residential aged care tended to have much longer stays in hospital than other patients. Thus, 50% of stays for people going into residential aged care were for 15 days or more, with 10% of stays lasting longer than 45 days; for people going into the community the corresponding figures were 5 days and 18 days.

While people moving to residential aged care tended to stay longer in hospital than others, stay patterns also varied with age and, to a lesser extent, with sex. Median length of stay in hospital tended to decrease as age increased among people who went from hospital into residential aged care (Illustration 2). For example, while the median length of stay was 20 days for hospital separations for people aged 65 to 69 years going into residential aged care, for those aged 80 to 84 years around 50% of hospital stays were for 15 days or less. Also, men tended to have slightly longer stays than women of the same age. Opposite patterns were observed among people who went from hospital back to the community. Among these people, older people tended to have longer stays than younger people, and, if anything, women tended to stay a little longer than men.

Illustration 2: Hospital separations: length of stay in hospital, by age, sex and movement type, NSW/ACT, 1999–00 (days)

Sex	Age at hospital separation/residential aged care admission	Hospital to RACS[a]		Hospital to community[b]		Total	
		Median	P90	Median	P90	Median	P90
Males	65–69 yrs	21	61	4	13	4	14
	70–74 yrs	17	52	4	15	4	15
	75–79 yrs	16	48	5	16	5	16
	80–84 yrs	16	46	5	17	5	18
	85–89 yrs	15	43	5	18	6	20
	90–94 yrs	15	41	6	19	6	21
	95+ yrs	12	53	6	19	6	22
	All	*16*	*48*	*4*	*16*	*5*	*16*
Females	65–69 yrs	19	53	4	14	4	14
	70–74 yrs	15	55	5	16	5	16
	75–79 yrs	15	42	5	17	5	18
	80–84 yrs	15	46	6	19	6	20
	85–89 yrs	15	43	6	20	7	22
	90–94 yrs	15	40	7	20	7	23
	95+ yrs	13	38	6	21	7	25
	All	*15*	*44*	*5*	*18*	*5*	*19*
All	65–69 yrs	20	56	4	14	4	14
	70–74 yrs	16	52	5	15	5	16
	75–79 yrs	15	45	5	17	5	17
	80–84 yrs	15	46	5	18	6	20
	85–89 yrs	15	43	6	20	6	21
	90–94 yrs	15	40	6	20	7	22
	95+ yrs	13	42	6	21	7	24
	All	**15**	**45**	**5**	**17**	**5**	**18**

(a)   Linked hospital and residential aged care records.

(b)   Unlinked hospital records; includes some cases where patients were transferred to another hospital.

Notes

1.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

2.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

3.   P90 is the ninetieth percentile.

A possible reason for these different stay patterns could be that the patients in the two groups entered hospital for different types of treatment. That this may be the case is illustrated in Illustration 3 where length of stay is given by hospital episode type, a broad indicator of treatment type. Here it can be seen that while overall 92% of hospital episodes were for acute care, for people who moved to residential aged care on discharge only 68% of episodes were for acute care; rehabilitation (15%) and non-acute care (16%) episodes were much more common for these people.

Rehabilitation and non-acute care episodes were relatively uncommon among patients who were discharged to the community, accounting for 5% and 1% of episodes, respectively. There seemed to be few differences due to age or sex, with the most noticeable difference being an increase with age in the prevalence of rehabilitation episodes among people who returned to the community after leaving hospital.

Illustration 3: Hospital separations, by age at hospital separation, sex, hospital episode type and movement type, NSW/ACT, 1999–00 (per cent)

Movement type	Episode type	Males			Females			All		
		65–79	80+	All	65–79	80+	All	65–79	80+	All
Hospital to RACS[a]	Acute care	65.5	68.1	67.0	67.3	68.3	68.0	66.5	68.2	67.6
	Rehabilitation	13.8	13.0	13.4	14.8	16.0	15.7	14.3	15.1	14.8
	Palliative care	3.4	1.9	2.5	2.2	0.8	1.2	2.8	1.2	1.7
	Non-acute care	17.0	16.8	16.9	15.7	14.7	15.0	16.3	15.4	15.7
	Other care	0.3	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2
	Total (%)	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*
Hospital to community[b]	Acute care	95.0	91.6	94.1	93.4	88.9	91.7	94.3	90.0	92.8
	Rehabilitation	3.2	5.3	3.8	4.6	7.7	5.8	3.9	6.8	4.8
	Palliative care	0.6	0.6	0.6	0.5	0.4	0.5	0.6	0.5	0.5
	Non-acute care	0.8	2.1	1.2	1.1	2.5	1.6	0.9	2.3	1.4
	Other care	0.3	0.4	0.3	0.4	0.5	0.5	0.4	0.4	0.4
	Total (%)	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*
Total	Acute care	94.6	90.5	93.5	93.0	87.5	90.8	93.8	88.7	92.1
	Rehabilitation	3.4	5.6	4.0	4.7	8.3	6.2	4.0	7.2	5.1
	Palliative care	0.7	0.7	0.7	0.5	0.4	0.5	0.6	0.5	0.6
	Non-acute care	1.0	2.8	1.5	1.3	3.3	2.1	1.2	3.1	1.8
	Other care	0.3	0.4	0.3	0.4	0.5	0.4	0.4	0.4	0.4
	Total (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a)   Linked hospital and residential aged care records.

(b)   Unlinked hospital records; includes some cases where patients were transferred to another hospital.

Notes

1.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

2.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

As expected, rehabilitation episodes tended to last longer than acute care episodes, with the median hospital stay for the former being 15 days compared with 5 days for the latter (Illustration 4). While this difference was observed both for people who moved to residential aged care and for those who returned to the community, people going on to aged care tended to have longer hospital stays than others for all episode types (Figure 3). Within episode type and movement type, there were only minor differences in length of stay by age and sex.

Source: Illustration 4

Figure 3: Illustrative example showing median length of hospital stay, by episode type and movement type, NSW/ACT, 1999–00
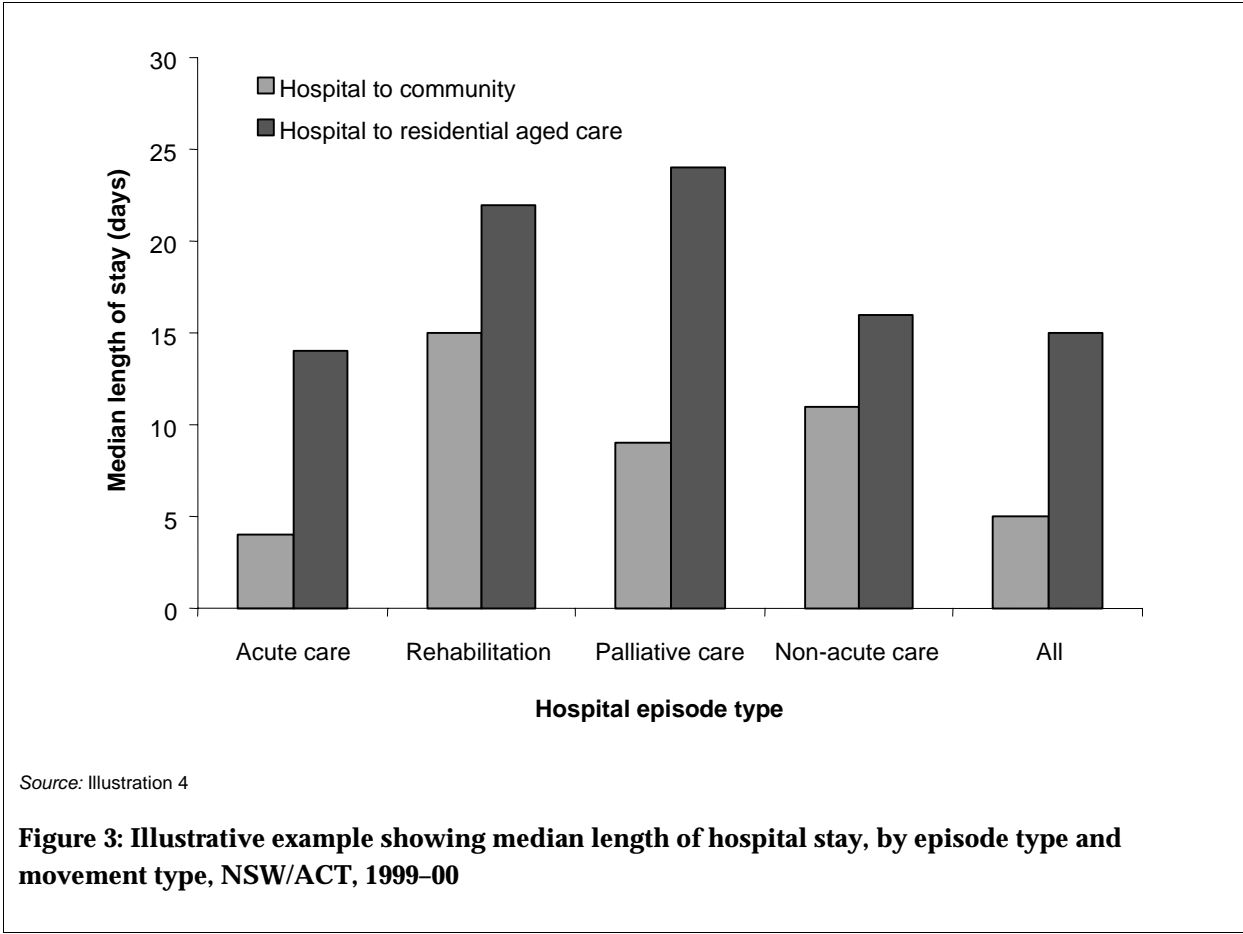
Illustration 4: Hospital separations: length of stay in hospital, by age at hospital separation, sex, hospital episode type and movement type, NSW/ACT, 1999–00 (days)

Movement type	Episode type		65–79 Median	65–79 P90	80+ Median	80+ P90	All Median	All P90
Hospital to RACS[a]	Acute care	Males	15	41	14	37	14	39
		Females	14	36	13	36	14	36
		All	*14*	*38*	*13*	*36*	*14*	*37*
	Rehabilitation	Males	26	60	23	52	25	56
		Females	24	58	21	48	22	50
		All	*25*	*60*	*22*	*49*	*22*	*52*
	Palliative care	Males	28	54	24	55	26	54
		Females	19	67	25	63	22	63
		All	*23*	*57*	*25*	*59*	*24*	*59*
	Non-acute care	Males	17	90	16	90	16	90
		Females	15	77	17	73	16	75
		All	*16*	*87*	*16*	*82*	*16*	*84*
	Other care[c]	*All*	*8*	*53*	*10*	*31*	*9*	*36*
	All	Males	17	52	15	45	16	48
		Females	15	47	15	43	15	44
		All	*16*	*49*	*15*	*43*	*15*	*45*
Hospital to community[b]	Acute care	Males	4	14	5	16	4	14
		Females	4	14	5	17	5	15
		All	*4*	*14*	*5*	*16*	*4*	*15*
	Rehabilitation	Males	14	40	15	36	14	38
		Females	14	35	16	35	15	35
		All	*14*	*37*	*15*	*35*	*15*	*36*
	Palliative care	Males	9	24	10	27	9	25
		Females	10	29	10	32	10	30
		All	*9*	*27*	*10*	*28*	*9*	*27*
	Non-acute care	Males	12	57	10	44	11	54
		Females	11	47	11	46	11	46
		All	*11*	*51*	*10*	*44*	*11*	*48*
	Other care	Males	6	21	7	17	6	19
		Females	7	32	7	18	7	27
		All	*6*	*28*	*7*	*18*	*7*	*23*
	All	Males	4	15	5	18	4	16
		Females	5	16	6	20	5	18
		All	*4*	*15*	*6*	*19*	*5*	*17*

(continued)

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Illustration 4 (continued): Hospital separations: length of stay in hospital, by age at hospital separation, sex, hospital episode type and movement type, NSW/ACT, 1999–00 (days)

Movement type	Episode type		65–79		80+		All	
			Median	**P90**	**Median**	**P90**	**Median**	**P90**
All	**Acute care**	Males	4	14	5	17	4	15
		Females	5	15	6	18	5	16
		All	*4*	*14*	*5*	*18*	*5*	*15*
	Rehabilitation	Males	15	42	15	38	15	40
		Females	15	36	16	37	15	36
		All	*15*	*39*	*16*	*37*	*15*	*38*
	Palliative care	Males	9	28	11	32	9	29
		Females	10	33	12	35	11	34
		All	*9*	*29*	*12*	*34*	*10*	*31*
	Non-acute care	Males	14	64	12	63	13	63
		Females	12	55	12	56	12	55
		All	*13*	*58*	*12*	*58*	*12*	*58*
	Other care	Males	6	21	7	18	6	20
		Females	7	33	7	19	7	27
		All	*6*	*28*	*7*	*18*	*7*	*23*
	All	Males	4	15	5	19	5	16
		Females	5	16	6	21	5	19
		All	**5**	**16**	**6**	**21**	**5**	**18**

(a) Linked hospital and residential aged care records.

(b) Unlinked hospital records; includes some cases where patients were transferred to another hospital.

(c) Numbers are too few to present median and ninetieth percentile by sex and age.

Notes

1. Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

2. These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

3. P90 is the ninetieth percentile.

The above analyses indicate that people going to residential aged care tended to have longer stays in hospital than other people in NSW/ACT in 1999–00, and that this could have been due to some extent to the type of care people were receiving. However, the question of whether people were staying longer than clinically necessary in hospital still remains. Given that DRGs are designed to provide a clinically meaningful way of relating the number and types of patients treated in a hospital to the resources required by the hospital, one possible way to investigate this issue is to see if there were any differences in length of stay within DRGs for those who went directly to residential aged care and those who went elsewhere on separation.

Illustration 5 shows the difference between the median length of hospital stay for people moving to residential aged care on discharge and those going elsewhere for

DRGs with 30 or more hospital episodes which had been linked to a residential aged care admission. This latter restriction on the analysis was applied to avoid those DRGs with only a small number of episodes; in such small DRGs differences could have been solely due to random variation. Overall, there were 61 DRGs with 30 or more linked records. For all of these DRGs the median length of stay for people going to residential aged care was at least as long as that for other people. Furthermore, for two-thirds of the DRGs the difference between the two medians was 7 days or more. These results suggest that people going into residential aged care may be staying longer than clinically necessary in hospital. However, the differences could also be caused by the greater frailty and medical needs of people who move into residential aged care compared with those who return to the community. The above analysis is only preliminary and further investigations would be required to examine this issue fully.

Illustration 5: Difference between median length of hospital stay for people moving to residential aged care and those going elsewhere on discharge from hospital, for DRGs with 30 or more hospital episodes linked to a residential aged care admission, NSW/ACT, 1999–00 (DRGs)

Difference between median length of stay	DRGs	
Days	Number	%
0	1	1.6
1–3	3	4.9
4–6	17	27.9
7–9	23	37.7
10–12	9	14.8
13–15	5	8.2
16+	3	4.9
Total	**61**	**100.0**

Note: These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

Whether the longer stays for people going to residential aged care were caused by problems with placing people in aged care services, or for other reasons—such as the need for longer stays due to greater frailty or medical complications—could be investigated using more complex analytical techniques, for example regression analysis. While such analysis is beyond the scope of the current project, the inclusion of provision ratios in investigations is illustrated in Section 7.5.

7.3 Diagnoses

The medical background of people leaving hospital may provide insight into their care needs after discharge. The distribution of principal diagnoses across hospital episodes both for those moving into residential aged care and for those going elsewhere is given in Illustration 6.

Illustration 6 suggests that in NSW/ACT in 1999–00 the profile of principal diagnosis was quite different for people who were discharged to residential aged care

compared with other patients. Overall, among people returning to the community cardiovascular disease was the most common principal diagnosis, accounting for 21% of hospital episodes. Six other principal diagnoses were also quite common: neoplasms (10%), respiratory system (9%), digestive system (10%), musculoskeletal system (8%), injury and poisoning (8%), and factors influencing health status and contact with health services (8)%.

Among people who moved from hospital to residential aged care cardiovascular disease was also quite a common principal diagnosis (13%). However, the most common principal diagnosis for these people was 'factors influencing health status and contact with health services'; this diagnosis accounted for 29% of principal diagnoses in hospital episodes for people who later moved into aged care services. 'Factors influencing health status and contact with health services' covers a diverse range of diagnoses, from entering hospital for examinations and investigations to awaiting admission to an adequate facility elsewhere. Further investigation of this group may provide useful insights into movements between sectors, especially in the future as 'Person awaiting admission to residential aged care service' was introduced as a diagnosis code in the third edition of ICD–10–AM. This edition was used for data collection from July 2002.

As for people going back to the community, diagnoses related to the respiratory system (8%) and injury and poisoning (10%) were also quite common for people going from hospital to residential aged care. However, a principal diagnosis related to mental disorders was more common among people who went to residential aged care than among other hospital discharges: 8% compared with 2%. It should be noted here that Alzheimer's disease is classified as a disease of the nervous system and so is not included in these figures. The percentages diagnosed with diseases or disorders of the nervous system or sense organs were 4% and 3% for the two groups, respectively.

There were some differences in the principal diagnoses by age and sex. However, the general patterns of common diagnoses were similar within a particular movement group (that is, hospital to residential aged care, and hospital to the community).

Illustration 6: Hospital separations by principal diagnosis, age at hospital separation, sex and movement type, NSW/ACT, 1999–00 (per cent)

Principal diagnosis (ICD-10-AM)	Males			Females			All		
	65–79	80+	All	65–79	80+	All	65–79	80+	All
Hospital to residential aged care[a]									
Certain infectious & Parasitic (A00–B99)	1.1	1.0	1.1	1.2	0.9	1.0	1.2	1.0	1.0
Neoplasms (C00–D48)	8.2	5.7	6.7	5.6	3.4	4.0	6.8	4.1	5.0
Blood & blood forming organs (D50–D89)	0.4	0.8	0.6	0.6	1.0	0.9	0.5	0.9	0.8
Endocrine, nutritional, metabolic & immunity (E00–E90)	2.3	1.8	2.0	1.6	1.8	1.7	1.9	1.8	1.8
Mental disorders(F00–F99)	9.2	8.5	8.8	9.8	6.3	7.3	9.5	7.0	7.8
Nervous system & sense organs(G00–G99)	7.4	4.3	5.6	4.4	3.5	3.7	5.8	3.7	4.4
Eye and adnexa (H00–H59)	0.3	0.4	0.4	0.5	0.5	0.5	0.4	0.5	0.5
Ear and mastoid process (H60–H95)	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1
Cardiovascular disease (I00–I99)	12.3	13.7	13.1	11.2	13.1	12.6	11.7	13.3	12.8
Respiratory system (J00–J99)	8.8	10.7	9.9	7.6	6.5	6.8	8.2	7.8	8.0
Digestive system (K00–K93)	3.8	3.4	3.6	2.9	4.3	3.9	3.4	4.0	3.8
Skin & subcutaneous tissue (L00–L99)	1.8	1.9	1.9	1.6	2.4	2.2	1.7	2.3	2.1
Musculoskeletal system (M00–M99)	2.3	2.2	2.2	4.3	4.2	4.2	3.3	3.6	3.5
Genito-urinary system (N00–N99)	4.0	4.4	4.2	3.2	3.9	3.7	3.6	4.0	3.9
Congenital anomalies (Q00–Q99)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Symptoms, sign & ill-defined conditions (R00–R99)	4.5	6.7	5.7	5.6	5.9	5.8	5.1	6.2	5.8
Injury & poisoning (S00–T98)	6.9	7.0	7.0	11.4	12.3	12.0	9.2	10.6	10.1
Factors influencing health status and contact with health services (Z00–Z99)	26.8	27.4	27.2	28.4	29.9	29.5	27.6	29.1	28.6
Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*
Total (row %)	*16.0*	*21.3*	*37.3*	*17.3*	*45.4*	*62.7*	*33.3*	*66.7*	*100.0*
Hospital to community[b]									
Certain infectious & Parasitic (A00–B99)	0.9	1.1	1.0	1.1	1.2	1.1	1.0	1.2	1.0
Neoplasms (C00–D48)	11.3	10.7	11.2	9.6	6.7	8.5	10.5	8.3	9.8
Blood & blood forming organs (D50–D89)	1.2	1.8	1.3	1.3	1.8	1.5	1.2	1.8	1.4
Endocrine, nutritional, metabolic & immunity (E00–E90)	1.3	1.2	1.3	1.8	1.7	1.8	1.6	1.5	1.5
Mental disorders(F00–F99)	1.4	1.6	1.5	2.2	2.2	2.2	1.8	1.9	1.8
Nervous system & sense organs(G00–G99)	3.0	2.5	2.8	2.4	2.2	2.3	2.7	2.3	2.5
Eye and adnexa (H00–H59)	2.5	3.5	2.7	3.9	4.2	4.0	3.1	3.9	3.4
Ear and mastoid process (H60–H95)	0.4	0.3	0.3	0.5	0.4	0.5	0.4	0.3	0.4
Cardiovascular disease (I00–I99)	23.2	20.1	22.4	18.6	19.6	19.0	21.1	19.8	20.6
Respiratory system (J00–J99)	10.0	11.2	10.3	8.6	8.3	8.5	9.4	9.4	9.4
Digestive system (K00–K93)	10.7	9.3	10.3	10.2	8.5	9.5	10.5	8.8	9.9
Skin & subcutaneous tissue (L00–L99)	1.7	1.9	1.7	1.9	2.6	2.2	1.8	2.4	2.0
Musculoskeletal system (M00–M99)	7.4	4.7	6.6	10.1	6.4	8.7	8.6	5.8	7.7
Genito-urinary system (N00–N99)	6.9	6.2	6.7	5.8	4.0	5.1	6.4	4.8	5.9
Congenital anomalies (Q00–Q99)	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1
Symptoms, sign & ill-defined conditions (R00–R99)	6.2	7.4	6.5	6.2	6.5	6.3	6.2	6.9	6.4
Injury & poisoning (S00–T98)	6.2	7.4	6.5	8.5	12.3	10.0	7.3	10.4	8.3
Factors influencing health status and contact with health services (Z00–Z99)	5.8	9.0	6.7	7.4	11.4	9.0	6.5	10.5	7.9
Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*
Total (row %)	*35.3*	*13.2*	*48.5*	*31.4*	*20.1*	*51.5*	*66.7*	*33.3*	*100.0*

(continued)

Illustration 6 (continued): Hospital separations by principal diagnosis, age at hospital separation, sex and movement type, NSW/ACT, 1999–00 (per cent)

Principal diagnosis (ICD–10–AM Ed. 1)	Males			Females			All		
	65–79	80+	All	65–79	80+	All	65–79	80+	All
All									
Certain infectious & Parasitic (A00–B99)	0.9	1.1	1.0	1.1	1.2	1.1	1.0	1.2	1.0
Neoplasms (C00–D48)	11.3	10.5	11.1	9.5	6.5	8.3	10.5	8.0	9.6
Blood & blood forming organs (D50–D89)	1.1	1.7	1.3	1.3	1.8	1.5	1.2	1.8	1.4
Endocrine, nutritional, metabolic & immunity (E00–E90)	1.4	1.3	1.3	1.8	1.7	1.8	1.6	1.5	1.5
Mental disorders(F00–F99)	1.5	1.9	1.6	2.3	2.4	2.3	1.9	2.2	2.0
Nervous system & sense organs(G00–G99)	3.0	2.6	2.9	2.4	2.3	2.3	2.7	2.4	2.6
Eye and adnexa (H00–H59)	2.4	3.3	2.7	3.8	3.9	3.9	3.1	3.7	3.3
Ear and mastoid process (H60–H95)	0.4	0.3	0.3	0.5	0.4	0.4	0.4	0.3	0.4
Cardiovascular disease (I00–I99)	23.1	19.8	22.2	18.5	19.1	18.8	20.9	19.4	20.4
Respiratory system (J00–J99)	10.0	11.1	10.3	8.6	8.2	8.4	9.3	9.3	9.3
Digestive system (K00–K93)	10.6	9.0	10.2	10.0	8.3	9.3	10.4	8.6	9.7
Skin & subcutaneous tissue (L00–L99)	1.7	1.9	1.7	1.9	2.6	2.2	1.8	2.3	2.0
Musculoskeletal system (M00–M99)	7.3	4.6	6.5	10.0	6.3	8.5	8.6	5.6	7.6
Genito-urinary system (N00–N99)	6.9	6.1	6.6	5.7	4.0	5.0	6.3	4.8	5.8
Congenital anomalies (Q00–Q99)	0.1	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1
Symptoms, sign & ill-defined conditions (R00–R99)	6.1	7.4	6.5	6.1	6.5	6.3	6.1	6.8	6.4
Injury & poisoning (S00–T98)	6.2	7.4	6.5	8.5	12.3	10.1	7.3	10.4	8.3
Factors influencing health status and contact with health services (Z00–Z99)	6.1	9.9	7.1	7.8	12.7	9.7	6.9	11.6	8.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total (row %)	**34.7**	**13.4**	**48.2**	**31.0**	**20.9**	**51.8**	**65.7**	**34.3**	**100.0**

(a)   Linked hospital and residential aged care records.

(b)   Unlinked hospital records; includes some cases where patients were transferred to another hospital.

Notes

1.   ICD–10–AM Ed. 1 is the international statistical classification of diseases and related health problems, 10th revision, Australian modification, first edition (NCCH 1998).

2.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

3.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

7.4 Costs

The cost of a hospital stay depends on both the treatments undertaken for particular diagnoses and the length of stay in hospital. Costs are often of interest in policy-related analyses, especially if there is reason to believe that the length of hospital stays could be shortened if alternative appropriate care could be found. As the hospital morbidity data records the DRG of a hospital episode, average costs associated with DRGs can be used to estimate the cost of hospital stays for those moving to residential aged care services and for those going to the community. Average DRG costs derived from the National Hospital Cost Data Collection 1999–00 were therefore added to the data set to illustrate how they might be used in an analysis of linked data.

Hospital stays identified as being associated with people who moved from hospital to a residential aged care service accounted for 3.1% of the hospital stays in the

current analysis, but 3.9% of the estimated costs (Illustration 7). These differences may have been due to a different mix of DRGs for hospital stays for people going into residential aged care compared with those for other people. Given the differences in principal diagnoses for the two groups observed in Table 15, this seems quite likely to have been the case. On average, hospital stays by people who then went to residential aged care cost nearly 30% more than stays for other people ($5,730 compared with $4,450—see Illustration 7).

Illustration 7: Hospital separations: estimated costs of hospital stay, by movement type, NSW/ACT, 1999–00

	Hospital to RACS[(a)]	Hospital to community[(b)]	All	Relative costs (a/b)
				Ratio
Average costs ($)	5,730	4,450	4,490	1.29
Total costs (%)	3.9	96.1	100.0	. .
Hospital separations (%)	3.1	96.9	100.0	. .

(a)   Linked hospital and residential aged care records.

(b)   Unlinked hospital records; includes some cases where patients were transferred to another hospital.

Notes

1.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

2.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

3.   Costs are estimated using DRG average costs.

7.5 Examining particular issues: an example

One of the prime reasons for linking data is so that information obtained for one data set can be combined with that from a second data set. In the current study, the main types of information contained in the hospital morbidity data which are not available in the residential aged care data are clinical diagnoses and procedures. On the other hand, data on care needs assessment are reported in the residential aged care data but not in the hospital data. In this section, the utility of combining these data is illustrated by looking at a particular issue: dementia (including Alzheimer's disease).[9] For this example, people with dementia include those with either a principal or additional diagnosis of dementia.

Client characteristics and length of stay in hospital

Analysis suggests that people diagnosed with dementia were more likely to be over 80 years old than other patients (Illustration 8). However, this trend was much more marked among patients not going into residential aged care than among other patients. Among people with dementia going into residential aged care 72% were aged over 80 compared with 64% of people with diagnoses that did not include

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[9] In this example dementia includes diagnoses of dementia and Alzheimer's disease (ICD–10–AM Ed. 1 categories F00 Dementia in Alzheimer's disease, F01 Vascular dementia, F02 Dementia in other diseases classified elsewhere, F03 Unspecified dementia, and G30 Alzheimer's disease).

dementia; among those going into the community the corresponding percentages were 67% and just 32%.

Among people going to residential aged care from hospital, the split between the sexes was affected very little by whether or not the hospital diagnoses included dementia: around 37% of these separations were for men. However, among those going elsewhere after discharge, 38% of hospital separations involving dementia were for men while nearly half of all other separations (49%) were for men.

There were only minor differences in median length of hospital stay for people with and without dementia going from hospital to residential aged care (Illustration 9). However, among those who went from hospital into the community, people diagnosed with dementia tended to stay longer in hospital than other patients: the median length for stay for those with dementia was 7 days compared with 4 days for other patients.

Illustration 8: Hospital separations, by movement type by diagnosis, age at hospital separation and sex, NSW/ACT, 1999–00

Movement type and diagnosis	Sex	Age			Age		
		65–79	80+	All	65–79	80+	All
Hospital to RACS[(a)]		Column per cent			Row per cent		
Dementia	Males	47.7	32.5	36.8	36.3	63.7	100.0
	Females	52.4	67.5	63.2	23.2	76.8	100.0
	All	*100.0*	*100.0*	*100.0*	*28.0*	*72.0*	*100.0*
Other diagnosis	Males	48.3	31.7	37.6	45.7	54.3	100.0
	Females	51.7	68.3	62.4	29.5	70.5	100.0
	All	*100.0*	*100.0*	*100.0*	*35.6*	*64.5*	*100.0*
All	Males	48.1	32.0	37.3	42.9	57.1	100.0
	Females	51.9	68.0	62.7	27.6	72.4	100.0
	All	**100.0**	**100.0**	**100.0**	**33.3**	**66.7**	**100.0**
Hospital to community[(b)]							
Dementia	Males	47.6	33.2	38.0	41.5	58.5	100.0
	Females	52.4	66.8	62.0	28.0	72.1	100.0
	All	*100.0*	*100.0*	*100.0*	*33.1*	*66.9*	*100.0*
Other diagnosis	Males	53.1	40.3	49.0	74.1	25.9	100.0
	Females	46.9	59.7	51.0	63.0	37.0	100.0
	All	*100.0*	*100.0*	*100.0*	*68.4*	*31.6*	*100.0*
All	Males	53.0	39.6	48.5	72.9	27.2	100.0
	Females	47.1	60.4	51.5	61.0	39.0	100.0
	All	**100.0**	**100.0**	**100.0**	**66.7**	**33.3**	**100.0**

(a)   Linked hospital and residential aged care records.

(b)   Unlinked hospital records; includes some cases where patients were transferred to another hospital.

Notes

1.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

2.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

Illustration 9: Hospital separations: length of stay in hospital by movement type by diagnosis, age at hospital separation and sex, NSW/ACT, 1999–00 (days)

Movement type and diagnosis	Sex	65–79	80+	All	65–79	80+	All
		Median			P90		
Hospital to residential aged care[a]							
Dementia	Males	16	15	16	49	44	47
	Females	15	15	15	44	44	44
	All	*16*	*15*	*15*	*46*	*44*	*44*
Other diagnosis	Males	17	15	16	52	45	49
	Females	15	15	15	48	42	44
	All	*16*	*15*	*15*	*50*	*43*	*46*
All	Males	17	15	16	52	45	48
	Females	15	15	15	47	43	44
	All	**16**	**15**	**15**	**49**	**43**	**45**
Hospital to community[b]							
Dementia	Males	7	7	7	24	22	22
	Females	7	7	7	24	22	23
	All	*7*	*7*	*7*	*24*	*22*	*23*
Other diagnosis	Males	4	5	4	15	17	15
	Females	5	6	5	16	20	17
	All	*4*	*6*	*5*	*15*	*19*	*16*
All	Males	4	5	4	15	18	16
	Females	5	6	5	16	20	18
	All	**4**	**6**	**5**	**15**	**19**	**17**

(a)   Linked hospital and residential aged care records.

(b)   Unlinked hospital records; includes some cases where patients were transferred to another hospital.

Notes

1.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

2.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

3.   P90 is the ninetieth percentile.

Availability of residential aged care

One reason for the longer hospital stays for patients who move from hospital to residential aged care could be difficulty in finding appropriate residential aged care for such people. Adding provision ratio information to the linked data set allows this issue to be investigated. More complex analysis than is possible here is required to examine this issue properly. However, a table by locality of hospital (Illustration 10) and another showing median length of stay by provision ratio (Illustration 11), show the type of data available.

Illustration 10: Hospital separations: length of stay in hospital by movement type, diagnosis and locality of hospital, NSW/ACT, 1999–00 (days)

Diagnosis	Locality of hospital	Hospital to residential aged care[a]		Hospital to community[b]	
		Median	P90	Median	P90
Dementia	Capital city	14	37	7	21
	Other metropolitan centre	19	47	7	25
	Large rural centre	17	86	6	24
	Small rural centre	17	73	6	25
	Other rural area	15	63	6	26
	Other remote area	[c] *	[c] *	6	34
	All	*15*	*44*	*7*	*23*
Other diagnosis	Capital city	16	42	5	17
	Other metropolitan centre	17	54	5	17
	Large rural centre	13	47	4	14
	Small rural centre	17	57	4	14
	Other rural area	13	59	4	14
	Other remote area	9	23	4	13
	All	*15*	*46*	*5*	*16*
All	Capital city	15	40	5	17
	Other metropolitan centre	18	51	5	17
	Large rural centre	14	54	4	15
	Small rural centre	17	60	4	15
	Other rural area	13	60	4	14
	Other remote area	11	28	4	14
	All	**15**	**45**	**5**	**17**

(a)   Linked hospital and residential aged care records.

(b)   Unlinked hospital records; includes some cases where patients were transferred to another hospital.

(c)   Sample was too small to allow meaningful comparisons.

Notes

1.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

2.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

3.   P90 is the ninetieth percentile.

4.   98 cases had missing data for locality of hospital.

In this study median length of stay varied little with the location of the hospital, especially among patients who returned to the community after hospital discharge (Illustration 10). The median length of hospital stay for these people was slightly longer in hospitals in capital cities or other metropolitan centres than in other hospitals for patients both with and without a diagnosis of dementia, but the median stays were only a day different. Among patients who moved on to residential aged care, median length of stay was more variable by locality of hospital. For these patients, those diagnosed with dementia had their shortest median length of stay in hospitals in capital cities (14 days) and longest in hospitals in other metropolitan areas (19 days). For patients without a diagnosis of dementia length of stay tended to be shorter in hospitals in large rural centres and other rural areas (median length of

stay 13 days), and longest in small rural centres and other metropolitan centres
(17 days). Analysis by the locality of a patient's usual residence may also be of
interest and could also be carried out.

Illustration 11 shows the length of hospital stay for people entering residential aged
care with and without a diagnosis of dementia by the level of provision of residential
aged care places in the SLA of the residential aged care service.[10] Among permanent
admissions with a hospital diagnosis of dementia the median length of stay declined
from 21 days where the provision ratio was between 61 and 70 places per 1,000
people aged 70 or more to 15 days where the provision ratio was greater than 110.
Interestingly, the median length of stay was relatively short where the provision ratio
was very low (less than 61 places per 1,000). A similar pattern was not obvious for
people without a hospital diagnosis of dementia. The decline in median hospital stay
with increasing provision ratio for the receiving residential aged care service was
also observed to some extent for respite admissions for people diagnosed with
dementia. However, the trend was not apparent among respite admissions without a
dementia diagnosis.

These results suggest that in some cases length of hospital stay may be related to the
availability of residential aged care places. However, the provision ratio is an
imperfect measure of care availability as it does not indicate how many places are
vacant at a particular time. Consequently, a better indicator of care availability would
be needed in order to investigate fully the relationship between availability of
residential aged care and length of hospital stay. Furthermore, Illustration 11
considers the provision ratio of the area of the receiving residential aged care service,
and not of either the hospital where the patient came from or of the usual residence
of the person prior to hospital admission. Analysis of the provision ratio by either of
these areas may be more useful for planning purposes.

The analysis presented in Illustration 11 is very simple and is presented only to
illustrate how provision ratio data could be included in an analysis involving linked
data. An example of the more sophisticated analyses which can be undertaken to
examine the relationship between both individual characteristics (for example,
marital status and health status) and system characteristics (such as provision ratio)
and a variable like length of stay in hospital is contained in the AIHW report *Entry
Period for Residential Aged Care* (AIHW 2002). In this report, the variable of interest is
entry period, that is the number of days which elapse between assessment of a
person by an Aged Care Assessment Team as being eligible for residential aged care
and the entry of that person into a residential aged care service for permanent care.
Both bivariate and multivariate analyses are presented in the report. While there was
evidence of a bivariate relationship between provision ratio and entry period, after
allowing for other factors the provision ratio in the region containing the residential
aged care service seemed to have little effect on entry period.

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[10] SLA of patient was not reliably available.

Illustration 11: Residential aged care admissions linked to hospital separations: length of stay in hospital by diagnosis, admission type and provision ratio, NSW/ACT, 1999–00 (days)

Provision ratio (residential aged care places per 1,000 aged 70+)[a]	Dementia		Other		All	
	Median	P90	Median	P90	Median	P90
Respite admissions						
Less than 61 places	13	42	14	43	14	42
61–70 places	26	45	15	38	15	42
71–80 places	15	37	13	36	14	37
81–90 places	17	47	14	42	15	44
91–100 places	14	32	14	39	14	38
101–110 places	14	35	17	38	16	37
More than 110 places	13	25	14	28	14	28
All	*15*	*42*	*14*	*38*	*14*	*39*
Permanent admissions						
Less than 61 places	17	42	19	56	18	50
61–70 places	21	71	23	65	23	71
71–80 places	20	61	23	62	22	61
81–90 places	19	54	19	54	19	54
91–100 places	18	58	20	56	20	58
101–110 places	17	42	22	51	20	48
More than 110 places	15	34	17	37	16	37
All	*18*	*52*	*21*	*55*	*20*	*54*
Total						
Less than 61 places	16	42	18	51	17	49
61–70 places	22	64	20	57	20	58
71–80 places	19	56	19	51	19	53
81–90 places	19	51	16	49	17	50
91–100 places	17	56	18	52	18	54
101–110 places	17	41	19	47	18	46
More than 110 places	14	32	15	34	15	34
All	**17**	**48**	**18**	**49**	**18**	**49**

(a)   Provision ratio of the area within which the residential aged care facility is placed (that is, of the aged care facility into which the patient is admitted).

Notes

1.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

2.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

3.   Residents returning from hospital leave are not included in the table.

Care needs

Using hospital diagnoses, the relationship between diagnosis and dependency on admission to residential aged care can be examined. Illustration 12 suggests that in 1999–00 in NSW/ACT people going from the community into residential aged care were less dependent than those going from hospital. Among those who went from the community into residential aged care, 55% were rated as needing high care while among those with a hospital diagnosis of dementia (either principal or additional) over 92% were high care admissions. At 81% of admissions, people entering from hospital with diagnoses which did not include dementia were more likely to be rated high care than those going from the community, but less likely than those with a diagnosis of dementia.

Illustration 12: Residential aged care admissions: RCS levels by diagnosis, NSW/ACT, 1999–00 (per cent)

RCS level	Hospital to residential aged care[a]			Community to residential aged care—no diagnosis[b]	All
	Principal diagnosis of dementia	Other dementia diagnosis	Other diagnoses		
High care					
S1	24.1	21.3	15.4	9.8	13.1
S2	43.6	40.7	35.1	20.9	27.8
S3	21.5	26.1	24.7	18.9	21.4
S4	4.3	4.6	5.5	5.8	5.6
Total	*93.5*	*92.6*	*80.6*	*55.4*	*67.9*
Total (row %)	*3.5*	*15.9*	*33.8*	*46.8*	*100.0*
Low care					
S5	1.5	3.6	6.1	10.2	8.0
S6	3.9	1.8	5.8	11.6	8.6
S7	1.2	1.9	6.9	19.8	13.6
S8	—	0.1	0.6	3.0	1.9
Total	*6.5*	*7.4*	*19.4*	*44.6*	*32.1*
Total (row %)	*0.5*	*2.7*	*17.2*	*79.6*	*100.0*
Total (%) [c]	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total (row %) [c]	**2.5**	**11.6**	**28.5**	**57.4**	**100.0**

(a)   Linked hospital and residential aged care records.

(b)   Unlinked residential aged care records.

(c)   RCS scores are not calculated for people admitted to residential aged care for respite care.

Notes

1.   Diagnosis of dementia includes diagnoses of dementia and Alzheimer's disease (ICD–10–AM Ed. 1 categories F00–F03, and G30) (NCCH 1998).

2.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

3.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

While the linked data set cannot be used to determine flows between hospitals and residential aged care, Illustration 12 suggests that a minimum of 15% of residential aged care admissions were for people who had a clinical diagnosis of dementia. Among high care admissions this percentage was about 20%.

The level of dependency in various areas can be examined by looking at the responses to particular questions in the Resident Classification Scale (RCS). For example, Figure 4 shows relative levels of dependency in the areas of personal care, behavioural care, and other care needs for people entering residential aged care from hospital (with and without a diagnosis of dementia) and for those entering from the community (see Table 10 for RCS question groupings). Dependency levels for a need group have been measured using the contribution that the relevant questions make to the total RCS score for an individual. To aid interpretation, standardised scores are used in the figure, where standardised scores have been obtained by dividing the relevant score for an admission by the corresponding maximum possible score and multiplying by 100. Consequently, standardised scores are between zero and 100, with zero being least dependent and 100 most dependent.

Figure 4 indicates that people admitted to aged care from hospital with a diagnosis of dementia had higher personal care needs than others. For example, around 85% of people diagnosed in hospital with dementia had a standardised personal care needs score greater than 70, compared with just over 70% of those entering from hospital with other diagnoses, and just under half of those entering from the community. The differences were not so marked for dependency related to behaviour: those entering with dementia again had higher needs than others, but the dependency levels for those entering from the community and from hospital with diagnoses other than dementia were similar. For other care needs, on average those entering residential aged care from the community had lower dependency levels than those entering from hospital, with hospital diagnosis affecting care needs only a little.
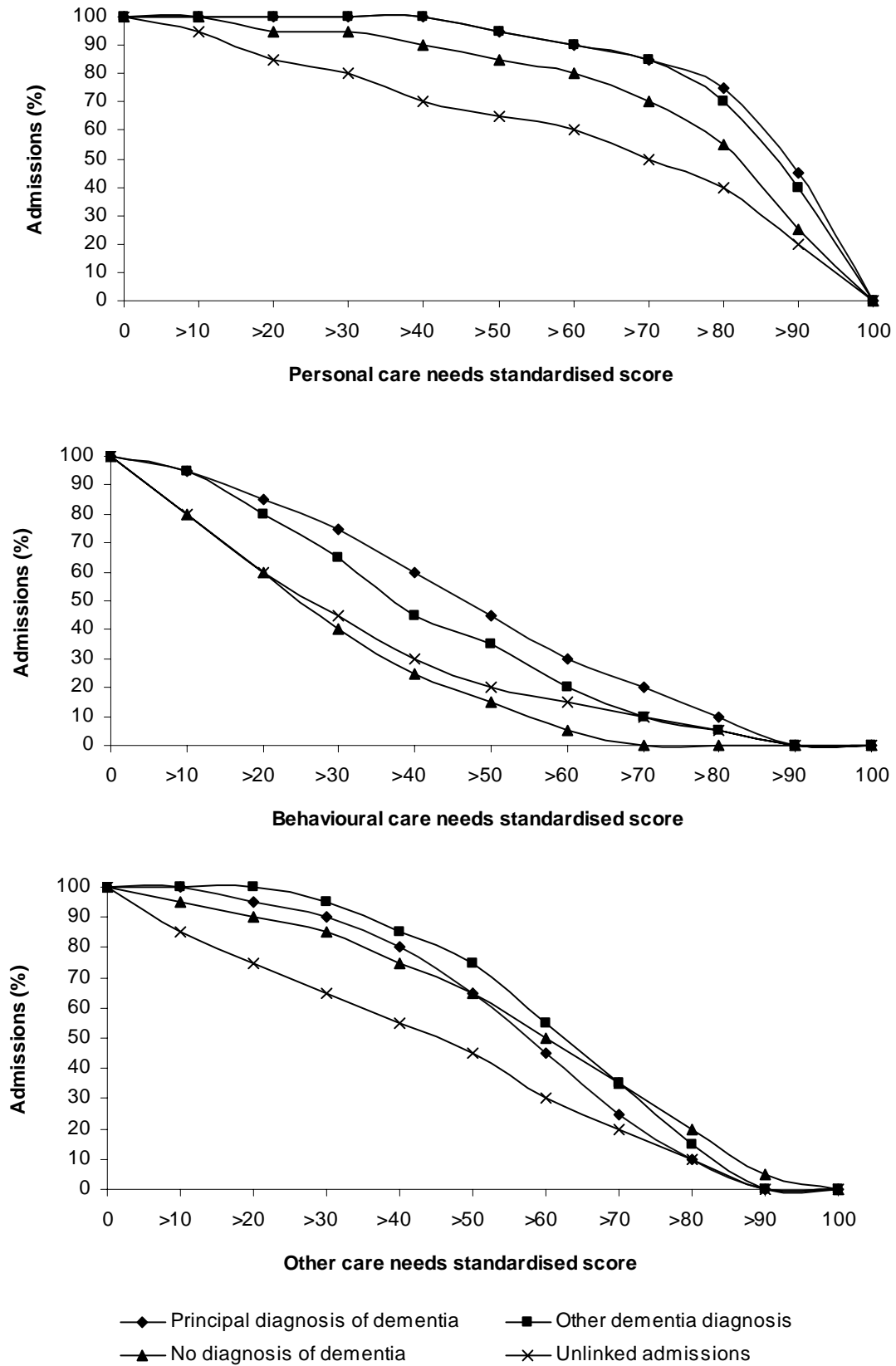
Source: Table A6

Figure 4: Illustrative example showing RCS scores for residential aged care admissions, by diagnosis, NSW/ACT, 1999–00

Table 10: Resident Classification Scale questions by care need group

RCS question	Need area
Personal care needs	
Q1	Communication
Q2	Location change, mobility and transfers
Q3	Meals and drinks
Q4	Personal hygiene
Q5	Toileting
Q6	Bladder management
Q7	Bowel management
Q8	Understanding and undertaking living arrangements
Behavioural care needs	
Q9	Problem wandering or intrusive behaviour
Q10	Verbally disruptive or noisy
Q11	Physically aggressive
Q12	Emotional dependence
Q13	Danger to self or others
Q14	Other behaviour
Other care needs	
Q15	Social and human needs—care recipient
Q16	Social and human needs—families and friends
Q17	Medications
Q18	Technical and complex nursing procedures
Q19	Therapy
Q20	Other services
Q21	Overall service need

Length of stay in residential aged care

In New South Wales over 90% of permanent residents who left the residential aged care system during 1999–00 either died (86%) or went to hospital (5%) (derived from AIHW 2001b:Table 3.5). A question of interest is whether people with certain illnesses or conditions tend to stay longer in residential aged care than others. As not all of those admitted in 1999–00 had left residential aged care at the time of taking the residential aged care data extract, the analysis of length of stay in residential aged care cannot be comprehensive. However, for this current study data are available to look at whether or not people who were admitted permanently in the first 6 months of 1999–00 were still living in the same residential aged care service 9 months after admission.

Overall, in Australia among those permanent residents who died while in residential aged care during 1999–00, 31% had been with the service for less than 9 months (AIHW 2001b:Table 3.8). Of the people admitted permanently into residential aged

care in NSW/ACT between 1 July and 31 December 1999, 26% died at the service within 9 months (Illustration 13).[11]

People coming from the community were less likely to have died within 9 months than those coming from hospital: 37% of those coming from hospital had died within 9 months compared with 18% of those who came from elsewhere (Illustration 13). In addition, a smaller proportion of those who entered residential aged care from hospital with a diagnosis including dementia died within 9 months than those who had other diagnoses only (32% compared with 39%).

Relatively more men than women died within 9 months, and, as expected, the chance of survival decreased as age increased. These age/sex patterns were seen in nearly all groups, irrespective of whether people came from hospital or the community and whether or not they had been diagnosed with dementia. However, there was a wide range of survival rates by age and sex. For example, 50% of men aged 80 years or more who came from hospital without a diagnosis of dementia had died within 9 months of admission, compared with just 14% of women aged 65 to 79 who came from the community.

The preceding discussion shows that length of stay in residential aged care can be examined using the linked data. More detailed analysis of resident survival could be carried out in the future (in 12 or 24 months) when more information on the separation of people admitted to the residential aged care service in 1999–00 is available. Lengths of stay for people who moved out either to hospital or to the community could also be investigated.

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[11] This assumes that people were admitted only once in the period.

Illustration 13: Permanent admissions into residential aged care: proportion who died in the residential aged care service within 9 months of admission, by movement type, diagnosis, age and sex, NSW/ACT, admissions 1 July–31 December 1999 (per cent)

Movement type and diagnosis	Sex	Per cent of residents who died within 9 months		
		65–79	**80+**	**All**
Hospital to residential aged care[a]		*Per cent within age/sex group*		
Dementia	Males	32.1	43.3	39.6
	Females	20.3	28.3	26.5
	All	*26.2*	*33.8*	*31.8*
Other diagnosis	Males	36.5	50.1	43.8
	Females	37.2	35.1	35.7
	All	*36.8*	*40.3*	*39.1*
Total	Males	35.4	47.5	42.3
	Females	31.9	32.6	32.5
	All	**33.8**	**37.9**	**36.6**
Community to residential aged care[b]				
No hospital diagnosis	Males	20.6	24.1	22.6
	Females	14.2	17.1	16.4
	All	**16.9**	**19.0**	**18.4**
All permanent admissions				
	Males	27.3	34.6	31.5
	Females	20.3	22.7	22.1
	All	**23.6**	**26.3**	**25.5**

(a)   Linked hospital and residential aged care records.

(b)   Unlinked residential aged care records.

Notes

1.   Diagnosis of dementia includes diagnoses of dementia and Alzheimer's disease (ICD–10–AM Ed. 1 categories F00–F03, and G30) (NCCH 1998).

2.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

3.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

4.   Data reflects notifications of residential aged care separations processed by 28 September 2000. Some notifications of discharge may not have been processed by this time.

7.6 Possible future analyses

The above examples give an indication of the types of data available for analysis, how data from the two data sources can be combined, and how external data can also be brought into the analysis. Furthermore, while the above analyses are illustrative only, the differing results for people moving variously between the hospital sector, the community and residential aged care were generally as would be expected, again confirming the face validity of the linkage strategy.

Only simple analyses have been presented above. However, using the linked data and more sophisticated analytical tools (for example, logistic regression or log linear modelling) a range of questions can be addressed. These include such matters as:

- How is the likelihood of transfer of older people from hospital to residential care instead of returning to the community associated with diagnosis, type of episode (acute care/non-acute care/rehabilitation), length of stay in hospital, marital status and usual accommodation, controlling for age and sex. Are there differences between regions (however defined) in the likelihood of transfer?

- How do people in aged care who have been transferred from hospital differ from those who came from the community with regard to sex, age and dependency levels. Are there differences between regions (however defined) in the variation between these two groups?

- How does length of stay in hospital for people who transfer to aged care vary with demographic factors, level of provision of residential aged care places, dependency levels, presence of dementia, diagnosis and episode type? Are there differences between regions (however defined) in length of stay after controlling for all these factors?

- How does length of stay in residential aged care vary with demographic factors, whether people come from hospital, level of provision of residential aged care places and dependency levels? Are there differences between regions (however defined) in length of stay after controlling for all these factors?

8 Data development

As stated in Section 5.4, revision of the current 'mode of separation' data item in the hospital morbidity collection, and the creation of a new variable in the residential aged care collection which indicates where the resident has come from would be an important first step towards improving national information on the movements of clients between the residential and acute care sectors. To this end, draft data definitions have been developed and are presented below. Development and implementation of these items would provide greatly improved information on the size of client flows between the two sectors, and facilitate statistical linkage by providing variables which would allow more accurate targeting of the linkage process.

The draft definitions given below are presented in the standard national template for data element specifications as used in national data dictionaries and national minimum data sets, for example, the *National Health Data Dictionary* (AIHW 2001a). Before the draft items are put forward for implementation, interested parties will need to be consulted to ensure that the new items are both useful and collectable.

8.1 Mode of separation (hospital)

The definition of this data element is currently included in the *National Health Data Dictionary* (NHDD). Currently, this data element is reported as part of the following National Minimum Data Sets (NMDS):

- Admitted patient care
- Admitted patient mental health care
- Admitted patient palliative care

This data element is collected at each hospital (including public and private acute and psychiatric hospitals and free standing day hospital facilities) from patient administrative and clinical record systems. Hospitals forward data to the relevant state or territory health authority on a regular basis (for example, monthly). State and territory health authorities provide the data to AIHW for national collation on an annual basis. The statistical unit is an episode of care for an admitted patient, rather than an individual patient. One person may have more than one episode of care during a continuous hospital stay.

Mode of separation as it is currently specified does not, however, identify all movements from hospital to residential aged care. Discharges to residential aged care are only separately identified where it is a new admission to residential aged care. Persons returning to a residential aged care service following a hospital admission are regarded as returning to their usual accommodation, and are therefore currently coded to Other (code 9). In the absence of further information on the person's usual accommodation prior to admission to hospital, it is not possible to identify whether persons have been discharged to a residential aged care service.

In order to identify all discharges to residential aged care it is necessary to identify separately persons whose usual accommodation is in a residential aged care service from all other discharges to usual accommodation. The suggested amendment to *Mode of separation* requires the addition of one code to the data domain, to identify persons returning to a residential aged care service where a residential aged care service was their usual residence prior to admission to hospital.

Mode of separation is suggested as the most appropriate data element for the collection of information on movements between hospital and residential aged care. It is an established data element in the three major admitted patient data collections, ensuring comprehensive coverage of the population of concern. It requires only a minor addition to the data domain in order to identify all discharges to residential aged care.

A further data item, Z75.11 of the ICD-10-AM Third Edition, was considered with regard to its potential to identify client flows between sectors of care. This data item identifies a 'Person awaiting admission to an(other) residential aged care service'. It is considered that, while this data item would facilitate analysis of the incidence of persons accommodated in hospital who are waiting to be admitted to residential aged care, it does not identify the destination of persons at discharge, and cannot therefore provide an accurate measure of direct client flows between hospital and residential aged care. That is, while a person may be identified as awaiting admission

to residential aged care, it does not necessarily follow that they will be directly admitted to residential aged care upon discharge from hospital.

Mode of separation

Admin. Status: CANDIDATE

Identifying and definitional attributes

Data element type: DATA ELEMENT

Definition: Status at separation of person (discharge/transfer/death) and place to which person is released (where applicable).

Context: Required for outcome analyses: for analyses of inter-sectoral patient flows and to assist in the continuity of care and classification of episodes into Diagnosis Related Groups.

Relational and representational attributes

Data type: Numeric   *Representational form:*   Code

Field size: *Min:*   1   *Max:*   1   *Representational layout:*   N

Data domain:
1   Discharge/transfer to an(other) acute hospital

2   Discharge to a residential aged care service, where a residential aged care service is *not* the usual place of residence

3   Discharge to a residential aged care service, where a residential aged care service *is* the usual place of residence

4   Discharge/transfer to an(other) psychiatric hospital

5   Discharge/transfer to other health care accommodation (includes mothercraft hospitals)

6   Statistical discharge—type change

7   Left against medical advice/discharge at own risk

8   Statistical discharge from leave

9   Died

10 Other (includes discharge to usual residence/own accommodation/welfare institution (includes prisons, hostels and group homes providing primarily welfare services). Excludes residential aged care services).

Guide for use: For Code 5—In jurisdictions where mothercraft facilities are considered to be acute hospitals, patients separated to a mothercraft facility should have a mode of separation of Code 1.

Related data:	is supplemented by Source of referral to public psychiatric hospital, version 3
	is supplemented by Source of referral to acute hospital or private psychiatric hospital, version 3
	supersedes Mode of separation, version 2
	is used in the derivation of Diagnosis related group, version 1

Administrative attributes

Source organisation:	National Health Data Committee	
National minimum data sets:	Admitted patient care	from 1/07/2000 to
	Admitted patient mental health care	from 1/07/2000 to
	Admitted patient palliative care	from 1/07/2000 to
Comments:	This data element identifies all discharges to residential aged care. In addition, it separately identifies discharges which are new admissions to residential aged care and discharges which are persons returning to residential aged care.	

Implementation

Any proposed changes to the current definition need to be considered by the National Health Data Committee (NHDC) and endorsed by the National Health Information Management Group (NHIMG). These two bodies have been established under the National Health Information Agreement. The Commonwealth Department of Health and Ageing and health departments in each State and Territory are signatories to the Agreement and are represented on both the NHDC and NHIMG. The ABS, the AIHW and the Health Insurance Commission are also signatories and are represented on both groups.

In the first instance, a proposal recommending changes to the current version of the definition needs to be put to the NHDC. This proposal needs to include a description of the source of the recommendation (in this case the AHMAC Care of Older Australians Working Group), and a detailed rationale for change that indicates the benefits to be gained and that justifies the inevitable cost of implementation. The proposal needs to be auspiced by one or more members of NHDC who will speak to the proposal at the NHDC meeting.

The NHDC will consider the merits of the proposal and the impact the recommended changes would have on the three NMDSs that use it. The NHDC also assesses the impact of the proposed changes on the definition of any other data elements in the NHDD to which *Mode of separation* is related to ensure that the coherence and internal consistency of the NHDD and NMDSs is not adversely affected. NHDC may suggest modifications to the proposed changes and refer the matter to the originating group (that is, the AHMAC Care of Older Australians Working Group) for their consideration. Once the proposed changes have been agreed by the NHDC, the new version of the data element definition is submitted to

NHIMG for their endorsement as part of a package of changes/additions for the next version of the NHDD.

Currently, the NHDD is released annually (usually around April). The NHDC recommends that any proposal for a change to the NHDD should be referred to it for consideration as early as possible. This allows time for adequate consideration by all jurisdictions. The NHDC usually meets three or four times a year and encourages those submitting proposals for changes to the NHDD to submit their proposal in time for consideration at their mid-year meeting (usually July/August). Final recommendations are made by the NHDC at their October meeting and decisions about the content of the next edition of the NHDD are usually made by NHIMG towards the end of the calendar year (November/December) for implementation from the following July.

Since the acceptance and implementation of a revision to the data item *Mode of separation* may take some time, it is suggested that in the meantime jurisdictions provide additional information and/or training to hospital staff with regards to coding patient transfers to residential aged care services.

8.2 Accommodation setting prior to admission to residential aged care

To measure accurately client flows between sectors of care a reliable measure of a person's accommodation setting immediately prior to entering residential aged care is required. At present, there is no information collected within the residential aged care program on the setting in which a person is accommodated immediately preceding entry to residential aged care. The only information collected on a person's accommodation setting is the accommodation setting in which the ACAT assessment took place, and the person's usual accommodation setting during the past two years. Both these items are collected on the Aged Care Application and Approval Form (2624). As in the preceding analysis, accommodation setting in which the ACAT assessment took place has often been used as a proxy measure of a person's accommodation setting immediately prior to admission to residential aged care. In particular, ACAT assessments that occurred in a hospital setting have been taken as an indication that the person has been admitted from hospital. However, the setting in which the ACAT assessment took place is not a reliable indicator of accommodation setting immediately prior to admission. An ACAT assessment is valid for a period of 12 months, and the person may have moved during the period between assessment and admission, for example, from home to hospital. In addition, the person may have only been temporarily located in the accommodation setting in which the ACAT assessment took place.

Three data elements related to accommodation setting are currently included in the *National Health Data Dictionary*, Version 10, 2001, and the *National Community Services Data Dictionary*, Version 2, 2000 (AIHW 2000). *Type of accommodation* and *Type of usual accommodation* in the *National Health Data Dictionary* are used in the Admitted Patient Mental Health Care National Minimum Data Set. Both these data elements refer to the type of accommodation in which the person usually lives, rather than

immediately prior to admission to care. That is, as for the accommodation setting in which the ACAT assessment took place, the person may not be located in their usual accommodation setting immediately prior to admission to residential aged care. In addition, these data elements do not allow the separate identification of people located in an acute care setting or people located in another residential aged care service. *Residential setting*, included in the *National Community Services Data Dictionary*, is defined generally as the setting in which a person resides, and not necessarily immediately prior to admission. In addition, it only distinguishes between private settings, community-based settings and institutional settings and as such does not allow the separate identification of persons in acute care settings or in residential aged care.

The data element *Accommodation setting prior to admission to residential aged care* has been drafted to provide a reliable and useful measure of a person's accommodation setting immediately prior to admission to residential aged care and is suggested for inclusion in the residential aged care program data collection. The data element provides information not only on the type of accommodation but also on the type of care the person is receiving. The data element has been defined to be the setting in which the person was accommodated *immediately* prior to entry to a residential aged care service. The data domain is based on the data domain for the data element *Residential setting* in the NCSDD, and is consistent with this national standard. In addition, the data domain incorporates the data domain of the data element *First face-to-face contact setting* used in the Aged Care Assessment Program (ACAP), and this will facilitate the comparison of data and understanding of client movements between assessment and entry to residential care. However, in comparison to the data elements *Residential setting* and *First face-to-face contact setting*, the proposed data element *Accommodation setting prior to admission to residential aged care* further defines persons living in private settings, community-based settings and institutional settings, and additionally identifies whether persons accommodated in private settings are in receipt of formal care services. The type of care received by persons accommodated in institutional settings (Hospital (acute care), Other inpatient settings, Residential aged care service (Codes 4,5, and 6)) and in Supported community-based accommodation (Code 3) is implicit in the type of accommodation.

To ensure comprehensive information on the residential aged care population and client flows between acute care and residential aged care, it is recommended that this data element be collected on the Resident Entry Record (Form 2721) which is completed by a residential aged care service for each new resident at admission. This includes persons who transfer from another residential aged care service and persons on leave from another service to receive temporary higher care. The only persons for whom this data element would not be collected are persons returning to the same residential aged care service after a period of leave, such as leave to receive care in hospital. However, information on persons returning to the same residential aged care service after a period of leave is available from the Residential Aged Care Payment Claim Form which records the beginning and end dates of the period of leave and the reason for the leave.

Accommodation setting prior to admission to residential aged care

Admin. Status: CANDIDATE

Identifying and definitional attributes

Data element type: DATA ELEMENT

Definition: The setting in which the person was accommodated immediately prior to admission to residential aged care.

Context: Permits analysis of the setting in which a person is accommodated immediately prior to admission to residential aged care. *Accommodation setting prior to admission* is distinct from *Type of accommodation* and *Type of usual accommodation* in the *National Health Data Dictionary*, Version 10, 2001, and from *Residential setting* in the *National Community Services Data Dictionary*, Version 2, 2000, as they record the type of accommodation in which a person usually resides. A person may not be accommodated in their usual place of residence immediately prior to admission.

Identification of accommodation setting immediately prior to admission to residential care facilitates analysis of movements between types of care.

Relational and representational attributes

Data type:	Numeric		*Representational form:*	Code
Field size:	*Min:* 1 *Max:* 1		*Representational layout:*	N

Data domain:
1   Private setting—receiving formal services

2   Private setting—not receiving formal services

3   Supported community-based accommodation

4   Hospital (acute care)

5   Other inpatient setting

6   Residential aged care service

7   None/homeless/public place

8   Other

9   Not stated/inadequately described *(not for use in primary data collections)*

Guide for use:
1   **Private setting—receiving formal services**: Includes private residences (such as houses, flats, units, caravans), boarding houses, private hotels, in which the person receives any support—regardless of the level of support received— from either staff or volunteers of formal support services, such as delivered meals, home help, personal care.

2   **Private setting—not receiving formal services:** Includes private residences (such as houses, flats, units, caravans), independent living in a retirement village, boarding houses, private hotels, in which the person does not receive any support from formal support services.

The person may receive informal care for which the informal carer does not receive payment other than a pension or benefit (excludes volunteers arranged by formal support services).

3   **Supported community-based accommodation:** Includes community living settings or accommodation facilities in which the person receives support—regardless of the level of support received— from either staff or volunteers of formal support services, such as delivered meals, home help, personal care, live-in or rostered support workers. Includes supported living in a retirement village, group homes and hostels for people with disabilities, cluster apartments where a support worker lives on site, community residential apartments, congregate care arrangements, and Supported Residential Services/Facilities (Victoria and South Australia only).

4   **Hospital (acute care):** Includes patients in hospital (public or private) classified by the hospital as 'acute care' patients.

5   **Other admitted patient setting:** Includes settings other than hospital acute care in which the person is an admitted patient receiving overnight care, admitted patients in extended care or rehabilitation facilities or other non-acute wards/beds in a hospital.

6   **Residential aged care service:** Includes all government funded residential aged care services (formerly nursing homes and aged care hostels), multi purpose services or multi purpose centres and Indigenous flexible pilots, regardless of the level of care received by the person or whether the person is a permanent or respite resident. Includes persons transferring from one Residential aged care service to another and persons on leave from another Residential aged care service for temporary provision of a higher level of care.

8   **Other:** Includes short-term crisis, emergency or transitional accommodation (such as night shelters, refuges, hostels for the homeless, halfway houses) which are not intended to function as permanent or ongoing accommodation options although some form of support may be provided.

Collection methods: This data element should be recorded for all persons admitted to a residential aged care service, and for each admission to a service as a person may be admitted more than once in any period.

This data element is a proposed data element for the residential aged care program data collection. Currently, there is no data element in the residential aged care program data collection which records a persons accommodation setting immediately prior to admission to a residential aged care service.

The Resident Entry Record (Form 2721) is recommended as the most appropriate method to collect this data element. A Residential aged care service is required to complete a Resident Entry Record for all new persons entering a residential aged care service, including persons who transfer from another Residential aged care service, and persons on leave from another service to receive temporary higher care. Details from the Resident Entry Record are stored on the Aged and Community Care Management Information System held by the Department of Health and Ageing.

The only persons for whom this data element would not be collected are persons returning to the same Residential aged care service after a period of leave, such as leave to receive care in hospital. Information on persons returning to a Residential aged care service from a period of leave would be available from the Residential Aged Care Payment Claim Form which records the beginning and end dates of the period of leave and the reason for the leave.

Related data:

Administrative attributes

Source document:

Source organisation:

Comments: Currently, the only information collected on a persons accommodation setting is the setting in which the ACAT assessment occurred, and this has been used as a proxy measure of the persons accommodation setting immediately prior to admission to residential aged care. This is not a reliable indicator as the ACAT assessment is valid for a period of twelve months and the person may have been temporarily located in the setting where the ACAT assessment took place, or may have moved in the intervening period between assessment and admission.

Implementation

This data element is not currently included in the NHDD. However, it could be a candidate for inclusion in future versions of either the NHDD or the *National Community Services Data Dictionary* (NCSDD), or both. The NCSDD is supported by structures and processes that parallel those in the health sector (that is, NCSDC, NCSIMG). At present, NCSIMG recognises and receives submissions from an established expert working group—Aged and Community Care Data Advisory Group (ACCDAG, Chaired by Warwick Bruen, Assistant Secretary, Community Care Branch, Department of Health and Ageing).

This data element is designed for inclusion on the Resident Entry Record (Form 2721) which is a Department of Health and Ageing form that is completed by a residential aged care service for each new resident at admission. This information would then be routinely entered onto the Department's residential aged care system (SPARC) and stored on ACCMIS (Aged and Community Care Management Information System). Information on ACCMIS is made available to the AIHW, and the AIHW currently analyses the data and publishes annual reports on residential aged care.

Changes to the Resident Entry Record are within the control of the Department and can be made without reference to any other authority. However, given the significance of the work of the AHMAC Care of Older Australians Working Group and the relevance of the data beyond the processing of payments for residential aged care services, it is appropriate to submit this data element definition for inclusion as a national standard in the NHDD. This would add coherence to the inclusion of the revised version of *Mode of separation* in the NHDD. This data element would also be

of interest to the community services sector and could be submitted (possibly via ACCDAG) for inclusion in the next version of the NCSDD (Version 3 is due for release in 2003) which already includes many aged and community care definitions (for example, for the HACC minimum data set). As with the NHDC/IMG processes, the NCSDC considers the merits of proposed additions or changes to the National Community Services Data Dictionary. When agreed by NCSDC, the proposal is submitted to NCSIMG as part of a package of changes to the Data Dictionary.

8.3 Other developments

The data items described above will facilitate the analysis of flows between the hospital and residential aged care sectors. However, as always, there is room for further improvement within the data collections. The analysis in this report is based on 1999–00 data, and since that time there have been a number of data developments. For example, the data item 'care type' (called 'episode type' in the hospital morbidity data) was refined for the tenth edition of the *National Health Data Dictionary*. In addition, as stated before, the third edition of ICD–10–AM (in use from 1 July 2002) includes a new diagnosis code which indicates whether a patient is waiting to get into residential aged care (Z75.11). However, limitations still remain.

Consider the issue of total time spent in hospital as opposed to the length of stay for separate episodes of care within a hospital stay. With respect to the current analysis, within the hospital morbidity data it was not possible to identify which episodes were for a particular person as that person changed from, for example, an acute care episode to a rehabilitation episode during a continuous stay in hospital. Inability to link these episodes led to the deletion of all but the person's last episode from the analysis. As a result, length of hospital stay derived for analyses such as those presented above does not reflect the total length of stay for people who changed episode type during their treatment in hospital. Across the jurisdictions included in this study, in 1999–00 around 2% of all hospital separations were statistical discharges (Table A35). The inclusion of a patient identifier which could be used to amalgamate episodes within a hospital stay would overcome this problem.

There may be other changes to the hospital and residential aged care data sets which would facilitate the examination of the interface between the two sectors. For example, the introduction of a variable in the hospital morbidity data which shows where people were admitted from could aid in studies of the movement of people from the community and residential aged care into hospital. Such an item could be modelled on the proposed data item *Accommodation setting prior to admission to residential aged care.* A more detailed review than has been possible in this study may point to further data developments that would improve the data sets' capacity to report on program interfaces and on system level performance.

9 Future directions

The analyses presented above indicate that the linkage strategy put forward in this study can provide a sample of linked client records which could be used to examine the association between aged care resident characteristics, diagnostic and episode variables, and length of stay in the hospital sector. However, because of restrictions applied to the linkage process to avoid false matching (in particular, same day hospital admissions and separations were excluded), the resulting linked data set cannot provide information on the size of client flows between the two sectors. Based on the available tests, date of birth, sex, exact separation date/admission date and SLA group of usual residence is the preferred linkage strategy.

9.1 Next steps—short term

Further validation of the linkage strategy is desirable to provide additional confirmation of its utility. If cooperation can be achieved between Western Australia and the AIHW on using the named hospital morbidity data for Western Australia in conjunction with the named residential aged care data set held by the AIHW, the accuracy of the current linkage strategy could be compared with a name-based linkage strategy.

The linkage strategy using date of birth, sex, exact separation date/admission date and SLA group of usual residence can be used to provide linked data sets to undertake detailed analysis of the interface between hospitals and aged care services. Analysis of the sectoral interface could be carried out for each state and territory separately. However, under such an approach admissions into residential aged care from an interstate hospital could not be included, and interstate movements could not be examined. While the number of interstate admissions is relatively small (see Table 24), it is preferable to include them.

Table 11: Permanent and respite admissions into residential aged care from interstate, by state, 1999–00

	State of residential aged care service				
	NSW/ACT	SA	WA	TAS	Total
Interstate admissions (number)	325	57	38	19	439
Interstate admissions (per cent all amissions)	1.1	0.7	0.6	0.8	1.0
Total admissions	29,236	7,625	6,796	2,368	46,025

Note: Table includes permanent and respite admissions only.

The preferred linkage key includes a within-jurisdiction geographic indicator of usual residence. Consequently, movements across jurisdiction boundaries can be allowed for by applying the linkage strategy to a combined national data set. However, in order to carry out analysis at the national level, permission to use the hospital morbidity data for data linkage still needs to be obtained from Victoria and the Northern Territory. Having obtained permission to use the data, the hospital morbidity data for these two jurisdictions would then need to be examined to see

whether it contains the data necessary to apply the linkage strategy. It is known that there may be limitations in the Victorian data as date of birth is not included in the standard Victorian hospital morbidity data. If any data limitations cannot be overcome through negotiation with the relevant jurisdictions, analysis will necessarily be restricted to state or multi-state level.

9.2 Next steps—longer term

The task of providing data at a system level rather than at program or sector level is complex and incremental steps toward that objective should be recognised and where possible implemented. The process to implement the two data items developed for this report should therefore be started. In addition, a more detailed review of the hospital morbidity and residential aged care data sets should be undertaken as it may point to further data developments that would improve the data sets' capacity to report on program interfaces and on system level performance. In particular, the development of a variable on the accommodation setting prior to admission to hospital should be investigated.

A linkage strategy which includes name, or incorporates a name-based key such as the HACC linkage key, could be expected to provide a preferred basis for linkage in the longer term, and attention should be directed towards developing such a capacity. This could also be used to link episodes for people within the hospital sector. However, because people's personal details, including name, can be recorded differently at different times, any linkage strategy should be based on probabilistic matching rather than deterministic matching (for a discussion of name-based linkage keys see the 2001 report *Statistical Data Linkage in Community Services Data Collections* prepared by the Statistical Linkage Key Working Group for NCSIMG (Statistical Linkage Key Working Group 2002)).

Many of the issues described above apply to the interface with the community sector (HACC, Community Aged Care Packages) and 'step down' services, and attention should also be directed toward the implications for linkage of data sets across these programs.

Appendix 1 Additional tables for New South Wales/Australian Capital Territory

A1.1 Additional tables

Table A1: Residential aged care admissions: age and sex by entry type, NSW/ACT, 1999–00

Sex and entry type	65–69 yrs	70–74 yrs	75–79 yrs	80–84 yrs	85–89 yrs	90–94 yrs	95+ yrs	Total
Males				**Number**				
Respite	334	684	1,202	1,244	1,045	397	71	4,977
Permanent	89	151	246	251	251	115	24	1,127
Return from leave	393	696	1,160	1,305	1,189	499	99	5,341
All	*816*	*1,531*	*2,608*	*2,800*	*2,485*	*1,011*	*194*	*11,445*
Females								
Respite	363	830	1,628	2,467	2,477	1,251	324	9,340
Permanent	69	158	368	674	714	408	116	2,507
Return from leave	298	733	1,562	2,519	2,688	1,400	378	9,578
All	*730*	*1,721*	*3,558*	*5,660*	*5,879*	*3,059*	*818*	*21,425*
Persons								
Respite	697	1,514	2,830	3,711	3,522	1,648	395	14,317
Permanent	158	309	614	925	965	523	140	3,634
Return from leave	691	1,429	2,722	3,824	3,877	1,899	477	14,919
All	**1,546**	**3,252**	**6,166**	**8,460**	**8,364**	**4,070**	**1,012**	**32,870**
Males				**Per cent**				
Respite	6.7	13.7	24.2	25.0	21.0	8.0	1.4	100.0
Permanent	7.9	13.4	21.8	22.3	22.3	10.2	2.1	100.0
Return from leave	7.4	13.0	21.7	24.4	22.3	9.3	1.9	100.0
All	*7.1*	*13.4*	*22.8*	*24.5*	*21.7*	*8.8*	*1.7*	*100.0*
Females								
Respite	3.9	8.9	17.4	26.4	26.5	13.4	3.5	100.0
Permanent	2.8	6.3	14.7	26.9	28.5	16.3	4.6	100.0
Return from leave	3.1	7.7	16.3	26.3	28.1	14.6	3.9	100.0
All	*3.4*	*8.0*	*16.6*	*26.4*	*27.4*	*14.3*	*3.8*	*100.0*
Persons								
Respite	4.9	10.6	19.8	25.9	24.6	11.5	2.8	100.0
Permanent	4.3	8.5	16.9	25.5	26.6	14.4	3.9	100.0
Return from leave	4.6	9.6	18.2	25.6	26.0	12.7	3.2	100.0
All	**4.7**	**9.9**	**18.8**	**25.7**	**25.4**	**12.4**	**3.1**	**100.0**

Table A2: The effect of age on duplication in the hospital morbidity data, NSW/ACT, 1999–00 (separations)

Linkage key	65–69 yrs	70–74 yrs	75–79 yrs	80–84 yrs	85–89 yrs	90–94 yrs	95+ yrs	All
				Number				
Date of birth and sex only								
Exact date								
Unique	57,088	70,224	74,150	56,250	36,107	13,310	2,781	309,910
2	3,168	4,496	5,190	3,098	1,418	216	16	17,602
3	84	192	240	132	42	6	—	696
4	4	4	4	—	—	—	—	12
Within 3 days								
Unique	48,949	58,541	61,349	48,475	32,385	12,622	2,732	265,053
2	10,074	14,167	15,729	9,718	4,722	859	64	55,333
3	1,199	1,977	2,260	1,173	434	49	1	7,093
4	115	191	227	105	26	2	—	666
5	7	33	19	9	—	—	—	68
6	—	7	—	—	—	—	—	7
Date of birth, sex and postcode								
Exact date								
Unique	60,238	74,806	79,442	59,378	37,511	13,520	2,793	327,688
2	106	110	142	102	56	12	4	532
Within 3 days								
Unique	59,705	74,176	78,858	58,931	37,235	13,431	2,780	325,116
2	632	724	714	538	326	100	17	3,051
3	7	16	12	11	6	1	—	53
Date of birth, sex and SLA								
Exact date								
Unique	60,160	74,682	79,230	59,229	37,425	13,508	2,787	327,021
2	184	234	354	248	142	24	10	1,196
3	—	—	—	3	—	—	—	3
Within 3 days								
Unique	58,942	73,220	77,768	58,184	36,786	13,300	2,754	320,954
2	1,379	1,660	1,779	1,263	757	227	43	7,108
3	23	34	37	33	24	5	—	156
4	—	2	—	—	—	—	—	2
All	**60,344**	**74,916**	**79,584**	**59,480**	**37,567**	**13,532**	**2,797**	**328,220**

(continued)

Table A2 (continued): The effect of age on duplication in the hospital morbidity data, NSW/ACT, 1999–00 (separations)

Linkage key	65–69 yrs	70–74 yrs	75–79 yrs	80–84 yrs	85–89 yrs	90–94 yrs	95+ yrs	All
				Row per cent				
Date of birth and sex only								
Exact date								
Unique	18.4	22.7	23.9	18.2	11.7	4.3	0.9	100.0
2	18.0	25.5	29.5	17.6	8.1	1.2	0.1	100.0
3	12.1	27.6	34.5	19.0	6.0	0.9	—	100.0
4	33.3	33.3	33.3	—	—	—	—	100.0
Within 3 days								
Unique	18.5	22.1	23.1	18.3	12.2	4.8	1.0	100.0
2	18.2	25.6	28.4	17.6	8.5	1.6	0.1	100.0
3	16.9	27.9	31.9	16.5	6.1	0.7	0.0	100.0
4	17.3	28.7	34.1	15.8	3.9	0.3	—	100.0
5	10.3	48.5	27.9	13.2	—	—	—	100.0
6	—	100.0	—	—	—	—	—	100.0
Date of birth, sex and postcode								
Exact date								
Unique	18.4	22.8	24.2	18.1	11.4	4.1	0.9	100.0
2	19.9	20.7	26.7	19.2	10.5	2.3	0.8	100.0
Within 3 days								
Unique	18.4	22.8	24.3	18.1	11.5	4.1	0.9	100.0
2	20.7	23.7	23.4	17.6	10.7	3.3	0.6	100.0
3	13.2	30.2	22.6	20.8	11.3	1.9	—	100.0
Date of birth, sex and SLA								
Exact date								
Unique	18.4	22.8	24.2	18.1	11.4	4.1	0.9	100.0
2	15.4	19.6	29.6	20.7	11.9	2.0	0.8	100.0
3	—	—	—	100.0	—	—	—	100.0
Within 3 days								
Unique	18.4	22.8	24.2	18.1	11.5	4.1	0.9	100.0
2	19.4	23.4	25.0	17.8	10.6	3.2	0.6	100.0
3	14.7	21.8	23.7	21.2	15.4	3.2	—	100.0
4	—	100.0	—	—	—	—	—	100.0
All	**18.4**	**22.8**	**24.2**	**18.1**	**11.4**	**4.1**	**0.9**	**100.0**

(continued)

Table A2 (continued): The effect of age on duplication in the hospital morbidity data, NSW/ACT, 1999–00 (separations)

Linkage key	65–69 yrs	70–74 yrs	75–79 yrs	80–84 yrs	85–89 yrs	90–94 yrs	95+ yrs	All
				Column per cent				
Date of birth and sex only								
Exact date								
Unique	94.6	93.7	93.2	94.6	96.1	98.4	99.4	94.4
2	5.2	6.0	6.5	5.2	3.8	1.6	0.6	5.4
3	0.1	0.3	0.3	0.2	0.1	0.0	—	0.2
4	0.0	0.0	0.0	—	—	—	—	0.0
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Within 3 days								
Unique	81.1	78.1	77.1	81.5	86.2	93.3	97.7	80.8
2	16.7	18.9	19.8	16.3	12.6	6.3	2.3	16.9
3	2.0	2.6	2.8	2.0	1.2	0.4	0.0	2.2
4	0.2	0.3	0.3	0.2	0.1	0.0	—	0.2
5	0.0	0.0	0.0	0.0	—	—	—	0.0
6	—	0.0	—	—	—	—	—	0.0
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Date of birth, sex and postcode								
Exact date								
Unique	99.8	99.9	99.8	99.8	99.9	99.9	99.9	99.8
2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.2
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Within 3 days								
Unique	98.9	99.0	99.1	99.1	99.1	99.3	99.4	99.1
2	1.0	1.0	0.9	0.9	0.9	0.7	0.6	0.9
3	0.0	0.0	0.0	0.0	0.0	0.0	—	0.0
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Date of birth, sex and SLA								
Exact date								
Unique	99.7	99.7	99.6	99.6	99.6	99.8	99.6	99.6
2	0.3	0.3	0.4	0.4	0.4	0.2	0.4	0.4
3	—	—	—	0.0	—	—	—	0.0
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Within 3 days								
Unique	97.7	97.7	97.7	97.8	97.9	98.3	98.5	97.8
2	2.3	2.2	2.2	2.1	2.0	1.7	1.5	2.2
3	0.0	0.0	0.0	0.1	0.1	0.0	—	0.0
4	—	0.0	—	—	—	—	—	0.0
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table A3: Hospital separation mode for 'within 3 days' linked data, unlinked hospital data and all hospital data, by linkage key used, NSW/ACT, 1999–00

Separation mode	Permanent admissions	Respite admissions	Return from leave	All linked entries	Unlinked hospital data	All hospital data
	Linked data				**Unlinked hospital data**	**All hospital data**
	Type of entry to residential aged care					
	Number					
Linkage key = date of birth, sex and within 3 days						
To another hospital	451	343	134	928	29,536	30,464
To nursing home	4,451	1,566	890	6,907	7,967	14,874
To other health care accommodation	182	305	73	560	1,497	2,057
Unknown	17	16	4	37	1,023	1,060
Other	3,520	3,481	2,081	9,082	270,683	279,765
All	**8,621**	**5,711**	**3,182**	**17,514**	**310,706**	**328,220**
Linkage key = date of birth, sex, within 3 days and SLA group						
To another hospital	193	111	44	348	30,116	30,464
To nursing home	3,766	1,308	579	5,653	9,221	14,874
To other health care accommodation	133	254	53	440	1,617	2,057
Unknown	8	6	1	15	1,045	1,060
Other	1,411	1,445	1,230	4,086	275,679	279,765
All	**5,511**	**3,124**	**1,907**	**10,542**	**317,678**	**328,220**
	Row per cent					
Linkage key = date of birth, sex within 3 days						
To another hospital	1.5	1.1	0.4	3.0	97.0	100.0
To nursing home	29.9	10.5	6.0	46.4	53.6	100.0
To other health care accommodation	8.8	14.8	3.5	27.2	72.8	100.0
Unknown	1.6	1.5	0.4	3.5	96.5	100.0
Other	1.3	1.2	0.7	3.2	96.8	100.0
All	**2.6**	**1.7**	**1.0**	**5.3**	**94.7**	**100.0**
Linkage key = date of birth, sex, within 3 days and SLA group						
To another hospital	0.6	0.4	0.1	1.1	98.9	100.0
To nursing home	25.3	8.8	3.9	38.0	62.0	100.0
To other health care accommodation	6.5	12.3	2.6	21.4	78.6	100.0
Unknown	0.8	0.6	0.1	1.4	98.6	100.0
Other	0.5	0.5	0.4	1.5	98.5	100.0
All	**1.7**	**1.0**	**0.6**	**3.2**	**96.8**	**100.0**
	Column per cent					
Linkage key = date of birth, sex and within 3 days						
To another hospital	5.2	6.0	4.2	5.3	9.5	9.3
To nursing home	51.6	27.4	28.0	39.4	2.6	4.5
To other health care accommodation	2.1	5.3	2.3	3.2	0.5	0.6
Unknown	0.2	0.3	0.1	0.2	0.3	0.3
Other	40.8	61.0	65.4	51.9	87.1	85.2
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, within 3 days and SLA group						
To another hospital	3.5	3.6	2.3	3.3	9.5	9.3
To nursing home	68.3	41.9	30.4	53.6	2.9	4.5
To other health care accommodation	2.4	8.1	2.8	4.2	0.5	0.6
Unknown	0.1	0.2	0.1	0.1	0.3	0.3
Other	25.6	46.3	64.5	38.8	86.8	85.2
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1.   SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2.   The linked data in this table is based on the number of unique residential aged care records linked; excess links have been excluded.

Table A4: Place of assessment for 'within 3 days' linked and unlinked residential aged care data, by linkage key used, NSW/ACT, 1999–00

	Linked data			Unlinked data			All residential aged care data		
	Permanent	Respite	All	Permanent	Respite	All	Permanent	Respite	All
					Number				
Linkage key = date of birth, sex and within 3 days									
Aged care facility	438	280	718	967	745	1,712	1,405	1,025	2,430
At home	1,482	1,845	3,327	3,820	6,838	10,658	5,302	8,683	13,985
Hospital	5,401	2,722	8,123	2,126	1,207	3,333	7,527	3,929	11,456
Other	243	198	441	442	482	924	685	680	1,365
Total	**7,564**	**5,045**	**12,609**	**7,355**	**9,272**	**16,627**	**14,919**	**14,317**	**29,236**
Linkage key = date of birth, sex, within 3 days and SLA group									
Aged care facility	252	164	416	1,153	861	2,014	1,405	1,025	2,430
At home	749	672	1,421	4,553	8,011	12,564	5,302	8,683	13,985
Hospital	4,297	2,171	6,468	3,230	1,758	4,988	7,527	3,929	11,456
Other	135	90	225	550	590	1,140	685	680	1,365
Total	**5,433**	**3,097**	**8,530**	**9,486**	**11,220**	**20,706**	**14,919**	**14,317**	**29,236**
					Per cent				
Linkage key = date of birth, sex and within 3 days									
Aged care facility	5.8	5.6	5.7	13.1	8.0	10.3	9.4	7.2	8.3
At home	19.6	36.6	26.4	51.9	73.7	64.1	35.5	60.6	47.8
Hospital	71.4	54.0	64.4	28.9	13.0	20.0	50.5	27.4	39.2
Other	3.2	3.9	3.5	6.0	5.2	5.6	4.6	4.7	4.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, within 3 days and SLA group									
Aged care facility	4.6	5.3	4.9	12.2	7.7	9.7	9.4	7.2	8.3
At home	13.8	21.7	16.7	48.0	71.4	60.7	35.5	60.6	47.8
Hospital	79.1	70.1	75.8	34.1	15.7	24.1	50.5	27.4	39.2
Other	2.5	2.9	2.6	5.8	5.3	5.5	4.6	4.7	4.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2. Admissions to residential aged care relating to hospital leave have been excluded.

3. The linked data in this table is based on the number of unique residential aged care records linked; excess links have been excluded.

Table A5: Comparison of marital status in hospital data and marital status in aged care data by 'within 3 days' linkage key used, linked data set, NSW/ACT, 1999–00

Residential aged care	Never married	Married including de facto	Widowed	Divorced or separated	Not stated	All
			Hospital morbidity data			
			Number			
Linkage key = date of birth, sex and within 3 days						
Never married	855	250	263	34	140	1,542
Married including de facto	125	3,775	675	107	175	4,857
Widowed	328	1,202	7,676	340	657	10,203
Divorced or separated	78	218	226	398	102	1,022
Unknown	10	25	70	5	15	125
All	**1,396**	**5,470**	**8,910**	**884**	**1,089**	**17,749**
Linkage key = date of birth, sex, within 3 days and SLA group						
Never married	687	34	91	10	92	914
Married including de facto	30	2,624	128	22	82	2,886
Widowed	140	283	5,089	205	396	6,113
Divorced or separated	44	42	104	320	65	575
Unknown	7	14	49	2	10	82
All	**908**	**2,997**	**5,461**	**559**	**645**	**10,570**
			Per cent			
Linkage key = date of birth, sex and within 3 days						
Never married	4.8	1.4	1.5	0.2	0.8	8.7
Married including de facto	0.7	21.3	3.8	0.6	1.0	27.4
Widowed	1.8	6.8	43.2	1.9	3.7	57.5
Divorced or separated	0.4	1.2	1.3	2.2	0.6	5.8
Unknown	0.1	0.1	0.4	0.0	0.1	0.7
All	**7.9**	**30.8**	**50.2**	**5.0**	**6.1**	**100.0**
Linkage key = date of birth, sex, within 3 days and SLA group						
Never married	6.5	0.3	0.9	0.1	0.9	8.6
Married including de facto	0.3	24.8	1.2	0.2	0.8	27.3
Widowed	1.3	2.7	48.1	1.9	3.7	57.8
Divorced or separated	0.4	0.4	1.0	3.0	0.6	5.4
Unknown	0.1	0.1	0.5	0.0	0.1	0.8
All	**8.6**	**28.4**	**51.7**	**5.3**	**6.1**	**100.0**

Note: SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

Table A6: Illustration showing residential aged care admissions: RCS standardised scores, needs by diagnosis, NSW/ACT, 1999–00 (per cent)

Standardised score [a] [b]	Principal diagnosis of dementia	Other dementia diagnosis	Other diagnoses	Unlinked admissions—no diagnosis	All
Personal care needs					
0–10	—	0.4	1.1	5.4	3.4
11–20	0.2	0.8	3.6	10.2	7.0
21–30	0.7	0.5	2.6	4.6	3.5
31–40	1.9	1.6	4.1	9.4	6.8
41–50	2.7	2.3	5.6	7.3	6.1
51–60	2.9	2.9	3.5	6.7	5.2
61–70	5.1	6.6	8.4	9.3	8.6
71–80	11.1	12.7	14.8	10.8	12.2
81–90	28.4	31.0	30.8	18.7	23.8
91–100	47.0	41.3	25.5	17.7	23.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Behavioural care needs					
0–10	5.1	7.9	18.2	21.5	18.6
11–20	10.8	13.4	20.5	19.0	18.6
21–30	12.3	17.3	20.5	17.1	17.9
31–40	13.3	18.0	16.9	13.9	15.2
41–50	15.4	12.8	9.1	9.1	9.7
51–60	12.8	13.3	7.7	8.0	8.7
61–70	11.1	9.3	3.8	5.2	5.4
71–80	8.7	3.8	1.9	3.3	3.1
81–90	10.6	4.1	1.5	3.0	2.9
91–100	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Other care needs					
0–10	2.2	1.7	4.3	13.6	9.3
11–20	2.7	1.5	3.2	9.2	6.5
21–30	4.3	3.5	4.8	11.0	8.2
31–40	10.6	8.3	7.9	12.9	10.9
41–50	14.0	13.7	9.2	11.9	11.4
51–60	20.5	17.6	14.0	12.9	14.0
61–70	19.0	19.9	17.4	11.2	14.2
71–80	14.9	18.7	17.8	8.5	12.5
81–90	11.6	13.4	18.0	7.6	11.3
91–100	0.2	1.7	3.3	1.2	1.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(continued)

Table A6 (continued): Illustration showing residential aged care admissions: RCS standardised scores, needs by diagnosis, NSW/ACT, 1999–00 (per cent)

Standardised score	Principal diagnosis of dementia	Other dementia diagnosis	Other diagnoses	Unlinked admissions—no diagnosis	All
All care needs					
0–10	—	0.1	0.6	3.4	2.1
11–20	0.5	0.9	4.4	13.1	8.9
21–30	2.7	1.7	4.8	11.2	8.1
31–40	2.2	2.4	5.8	10.8	8.2
41–50	5.3	5.2	7.2	10.0	8.5
51–60	11.1	17.4	16.9	14.3	15.3
61–70	35.7	31.6	31.2	18.4	24.0
71–80	33.0	33.2	24.9	15.6	20.7
81–90	9.6	7.3	4.0	3.2	4.1
91–100	—	0.2	0.2	0.1	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a)   Standardised scores are obtained by dividing the score for an admission by the maximum possible score, and multiplying by 100.

(b)   RCS scores are not calculated for people admitted to residential aged care for respite care.

Notes

1.   Diagnosis of dementia includes diagnoses of dementia and Alzheimer's disease (ICD-10 categories F00–F03, and G30) (NCCH 1998).

2.   Personal care needs score is derived from RCS questions 1 to 8 (see Table 22).

3.   Behavioural care needs care score is derived from RCS questions 9 to 14 (see Table 22).

4.   Other care needs score is derived from RCS questions 15 to 21 (see Table 22).

5.   Duplicates have not been removed from the linked data. The totals have been created by adding the linked and the unlinked data so that any effects of the duplicates on the distribution also affects the totals. Fewer than 1% of linked records were duplicates.

6.   These data are presented to illustrate the capacity of the linkage methodology and are not intended as a basis for policy or planning.

A1.2 Preliminary tables including same day hospital separations

Table A7: Duplicates in the hospital morbidity data extract, including same day separations, NSW/ACT, 1999–00 (separations, number and per cent)

Number of repeats	Exact date	Within 1 day	Within 2 days	Within 3 days	Exact date	Within 1 day	Within 2 days	Within 3 days
	Number				**Per cent**			
Linkage key = Date of birth and sex only								
Unique	543,169	483,675	411,450	362,207	88.4	78.7	66.9	58.9
2	66,238	112,031	153,390	176,596	10.8	18.2	25.0	28.7
3	5,022	16,762	39,279	55,493	0.8	2.7	6.4	9.0
4	328	2,057	8,703	15,472	0.1	0.3	1.4	2.5
5	5	217	1,570	3,868	0.0	0.0	0.3	0.6
6	6	14	286	857	0.0	0.0	0.0	0.1
7	—	10	71	196	—	0.0	0.0	0.0
8	—	2	14	52	—	0.0	0.0	0.0
9	—	—	2	14	—	—	0.0	0.0
10	—	—	—	6	—	—	—	0.0
11	—	—	3	3	—	—	0.0	0.0
12	—	—	—	4	—	—	—	0.0
All	**614,768**	**614,768**	**614,768**	**614,768**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex and postcode								
Unique	612,698	607,503	576,784	559,821	99.7	98.8	93.8	91.1
2	2,064	7,188	36,510	52,457	0.3	1.2	5.9	8.5
3	6	69	1,410	1,896	0.0	0.0	0.2	0.3
4	—	8	60	588	—	0.0	0.0	0.1
5	—	—	2	4	—	—	0.0	0.0
6	—	—	2	2	—	—	0.0	0.0
All	**614,768**	**614,768**	**614,768**	**614,768**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex and SLA								
Unique	564,728	519,587	453,717	410,744	91.9	84.5	73.8	66.8
2	46,604	82,379	126,422	150,636	7.6	13.4	20.6	24.5
3	3,273	11,443	27,747	39,514	0.5	1.9	4.5	6.4
4	152	1,204	5,651	10,574	0.0	0.2	0.9	1.7
5	5	120	981	2,551	0.0	0.0	0.2	0.4
6	6	32	226	557	0.0	0.0	0.0	0.1
7	—	3	18	165	—	0.0	0.0	0.0
8	—	—	3	18	—	—	0.0	0.0
9	—	—	3	3	—	—	0.0	0.0
10	—	—	—	6	—	—	—	0.0
All	**614,768**	**614,768**	**614,768**	**614,768**	**100.0**	**100.0**	**100.0**	**100.0**

Table A8: Records with unique linkage keys in the hospital morbidity data extract including same day separations, by linkage key and age group, NSW/ACT, 1999–00 (per cent of all records)

Linkage key	65–69 yrs	70–74 yrs	75–79 yrs	80–84 yrs	85–89 yrs	90–94 yrs	95+ yrs	All
Exact date								
Date of birth and sex	87.6	85.9	86.6	91.0	94.5	97.7	99.2	88.4
Date of birth, sex and postcode	99.7	99.6	99.6	99.6	99.8	99.8	99.8	99.7
Date of birth, sex and SLA	99.2	99.0	99.0	99.1	99.3	99.5	99.6	99.1
Within 3 days								
Date of birth and sex	54.7	50.9	54.5	67.5	79.7	90.9	96.2	58.9
Date of birth, sex and postcode	88.1	88.5	91.2	94.3	97.6	98.8	98.9	91.1
Date of birth, sex and SLA	79.8	79.1	83.5	89.2	94.5	97.0	97.4	83.8
All records (number)	**135,908**	**160,689**	**151,592**	**95,114**	**51,487**	**16,660**	**3,318**	**614,768**

Note: SLA is derived from postcode and SLA data provided in the hospital morbidity data—see footnote 4.

Table A9: Duplicates in the linked data using different linkage keys, including same day separations, NSW/ACT, 1999–00

Linkage key	Exact date match		Within 3 days	
	Number	Per cent	Number	Per cent
Date of birth, sex and date of separation/admission				
Number of RACS records linked to one hospital record				
1	14,600	98.7	21,444	97.7
2	196	1.3	504	2.3
3	—	—	3	0.0
Number of hospital records linked to one RACS record				
1	12,566	84.9	13,328	60.7
2	2,010	13.6	5,870	26.7
3	204	1.4	2,037	9.3
4	16	0.1	540	2.5
5	—	—	145	0.7
6	—	—	24	0.1
7	—	—	7	0.0
Total	**14,796**	**100.0**	**21,951**	**100.0**
Date of birth, sex and date of separation/admission and postcode				
Number of RACS records linked to one hospital record				
1	4,083	99.8	4,373	99.8
2	8	0.2	24	0.2
3	—	—	—	—
Number of hospital records linked to one RACS record				
1	4,057	99.2	4,291	97.6
2	34	0.8	100	2.3
3	—	—	6	0.1
Total	**4,091**	**100.0**	**4,397**	**100.0**
Date of birth, sex and date of separation/admission and SLA group				
Number of RACS records linked to one hospital record				
1	10,044	99.9	10,849	99.5
2	14	0.1	58	0.5
Number of hospital records linked to one RACS record				
1	9,948	98.9	10,420	95.5
2	110	1.1	442	4.1
3	—	—	45	0.4
Total	**10,058**	**100.0**	**10,907**	**100.0**

Table A10: Duplicates in the linked data using different linkage keys, by age, includes same day separations, NSW/ACT, 1999–00

Linkage key	65–69 yrs	70–74 yrs	75–79 yrs	80–84 yrs	85–89 yrs	90–94 yrs	95+ yrs	Total
				Number				
Date of birth and sex, and hospital discharge/RACS admission within 3 days								
Number of RACS records linked to one hospital record								
Unique	1,314	2,924	5,077	5,468	4,373	1,869	419	21,444
Not unique	6	22	78	165	170	56	10	507
Number of hospital records linked to one RACS record								
Unique	648	1,292	2,505	3,436	3,343	1,694	410	13,328
Not unique	672	1,654	2,650	2,197	1,200	231	19	8,623
Total	**1,320**	**2,946**	**5,155**	**5,633**	**4,543**	**1,925**	**429**	**21,951**
Date of birth, sex and exact discharge/admission date								
Number of RACS records linked to one hospital record								
Unique	813	1,692	3,094	3,671	3,321	1,613	396	14,600
Not unique	4	6	22	70	72	18	4	196
Number of hospital records linked to one RACS record								
Unique	621	1,271	2,424	3,187	3,091	1,580	392	12,566
Not unique	196	427	692	554	302	51	8	2,230
Total	**817**	**1,698**	**3,116**	**3,741**	**3,393**	**1,631**	**400**	**14,796**
Date of birth, sex, exact discharge/admission date and postcode								
Number of RACS records linked to one hospital record								
Unique	183	401	744	1,017	1,049	540	149	4,083
Not unique	—	—	—	6	—	2	—	8
Number of hospital records linked to one RACS record								
Unique	175	395	738	1,019	1,041	542	147	4,057
Not unique	8	6	6	4	8		2	34
Total	**183**	**401**	**744**	**1,023**	**1,049**	**542**	**149**	**4,091**
Date of birth, sex, exact discharge/admission date and SLA group								
Number of RACS records linked to one hospital record								
Unique	496	961	1,906	2,509	2,520	1,312	340	10,044
Not unique	—	—	—	8	4	2	—	14
Number of hospital records linked to one RACS record								
Unique	480	933	1,876	2,499	2,512	1,312	336	9,948
Not unique	16	28	30	18	12	2	4	110
Total	**496**	**961**	**1,906**	**2,517**	**2,524**	**1,314**	**340**	**10,058**

(continued)

Table A10 (continued): Duplicates in the linked data using different linkage keys, by age, includes same day separations, NSW/ACT, 1999–00

Linkage key	65–69 yrs	70–74 yrs	75–79 yrs	80–84 yrs	85–89 yrs	90–94 yrs	95+ yrs	Total
				Column per cent				
Date of birth and sex, and hospital discharge/RACS admission within 3 days								
Number of RACS records linked to one hospital record								
Unique	99.5	99.3	98.5	97.1	96.3	97.1	97.7	97.7
Not unique	0.5	0.7	1.5	2.9	3.7	2.9	2.3	2.3
Number of hospital records linked to one RACS record								
Unique	49.1	43.9	48.6	61.0	73.6	88.0	95.6	60.7
Not unique	50.9	56.1	51.4	39.0	26.4	12.0	4.4	39.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Date of birth, sex, and exact discharge/admission date								
Number of RACS records linked to one hospital record								
Unique	99.5	99.6	99.3	98.1	97.9	98.9	99.0	98.7
Not unique	0.5	0.4	0.7	1.9	2.1	1.1	1.0	1.3
Number of hospital records linked to one RACS record								
Unique	76.0	74.9	77.8	85.2	91.1	96.9	98.0	84.9
Not unique	24.0	25.1	22.2	14.8	8.9	3.1	2.0	15.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Date of birth, sex, exact discharge/admission date and postcode								
Number of RACS records linked to one hospital record								
Unique	100.0	100.0	100.0	99.4	100.0	99.6	100.0	99.8
Not unique	—	—	—	0.6	—	0.4	—	0.2
Number of hospital records linked to one RACS record								
Unique	95.6	98.5	99.2	99.6	99.2	100.0	98.7	99.2
Not unique	4.4	1.5	0.8	0.4	0.8	—	1.3	0.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Date of birth, , sex, exact discharge/admission date and SLA group								
Number of RACS records linked to one hospital record								
Unique	100.0	100.0	100.0	99.7	99.8	99.8	100.0	99.9
Not unique	—	—	—	0.3	0.2	0.2	—	0.1
Number of hospital records linked to one RACS record								
Unique	96.8	97.1	98.4	99.3	99.5	99.8	98.8	98.9
Not unique	3.2	2.9	1.6	0.7	0.5	0.2	1.2	1.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Appendix 2 Tables for Western Australia

Table A11: Duplicates in the residential aged care extract using different linkage keys, by type of resident, Western Australia, 1999–00 (admissions, number and per cent)

Linkage key	Permanent	Respite	Leave	All	Permanent	Respite	Leave	All
		Number				**Per cent**		
Exact dates								
Linkage key = Date of birth, sex and admission date								
Unique	3,610	3,184	1,290	8,076	99.9	100.0	100.0	99.9
2	2	—	—	10	0.1	—	—	0.1
All	**3,612**	**3,184**	**1,290**	**8,086**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex admission date and postcode								
Unique	3,610	3,184	1,290	8,080	99.9	100.0	100.0	99.9
2	2	—	—	6	0.1	—	—	0.1
All	**3,612**	**3,184**	**1,290**	**8,086**	**100.0**	**100.0**	**100.0**	**100.0**
Within 3 days								
Linkage key = Date of birth, sex and admission date								
Unique	3,605	3,177	1,287	8,007	99.8	99.8	99.7	99.0
2	7	7	3	79	0.2	0.2	0.2	1.0
All	**3,612**	**3,184**	**1,290**	**8,086**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex admission date and postcode								
Unique	3,610	3,184	1,288	8,048	99.9	100.0	99.8	99.5
2	2	—	2	38	0.1	—	0.2	0.5
All	**3,612**	**3,184**	**1,290**	**8,086**	**100.0**	**100.0**	**100.0**	**100.0**

Note: Duplicates among 'All' records include cases with the same linkage key but a different type of resident entry. Consequently the number of unique linkage keys among 'All' records is larger than the sum of the duplicates in the three resident entry types.

Table A12: Duplicates in the hospital morbidity extract using different linkage keys, Western Australia, 1999–00 (separations)

Number of duplicates	Date of birth and sex only		Date of birth, sex and postcode		Date of birth, sex and SLA	
	Exact date	Within 3 days	Exact date	Within 3 days	Exact date	Within 3 days
Number						
Unique	81,920	78,105	83,102	82,070	83,128	82,186
2	1,542	5,096	382	1,343	356	1,234
3	18	268	—	70	—	63
4	4	15	—	1	—	1
All	**83,484**	**83,484**	**83,484**	**83,484**	**83,484**	**83,484**
Per cent						
Unique	98.1	93.6	99.5	98.3	99.6	98.4
2	1.8	6.1	0.5	1.6	0.4	1.5
3	0.0	0.3	—	0.1	—	0.1
4	0.0	0.0	—	0.0	—	0.0
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Note: SLA is derived from postcode and SLA data provided in the hospital morbidity data—see footnote 4.

Table A13: The effect of age on the per cent of unique linkage keys in the hospital morbidity data, using different linkage keys, Western Australia, 1999–00 (separations)

Linkage key	65–69	70–74	75–79	80–84	85–89	90–94	95+	All
Exact date			Number with unique linkage keys					
Date of birth and sex	15,703	18,492	18,868	14,295	9,886	3,881	795	81,920
Date of birth, sex and postcode	15,912	18,786	19,201	14,508	10,003	3,895	797	83,102
Date of birth, sex and SLA	15,910	18,792	19,209	14,510	10,009	3,901	797	83,128
Within 3 days								
Date of birth and sex	14,941	17,487	17,876	13,672	9,539	3,806	784	78,105
Date of birth, sex and postcode	15,686	18,534	18,996	14,329	9,877	3,861	787	82,070
Date of birth, sex and SLA	15,703	18,566	19,024	14,346	9,891	3,869	787	82,186
All records	**15,980**	**18,874**	**19,279**	**14,578**	**10,055**	**3,919**	**799**	**83,484**
Exact date			Per cent with unique linkage keys					
Date of birth and sex	98.3	98.0	97.9	98.1	98.3	99.0	99.5	98.1
Date of birth, sex and postcode	99.6	99.5	99.6	99.5	99.5	99.4	99.7	99.5
Date of birth, sex and SLA	99.6	99.6	99.6	99.5	99.5	99.5	99.7	99.6
Within 3 days								
Date of birth and sex	93.5	92.7	92.7	93.8	94.9	97.1	98.1	93.6
Date of birth, sex and postcode	98.2	98.2	98.5	98.3	98.2	98.5	98.5	98.3
Date of birth, sex and SLA	98.3	98.4	98.7	98.4	98.4	98.7	98.5	98.4

Note: SLA is derived from postcode and SLA data provided in the hospital morbidity data—see footnote 4.

Table A14: Duplicates in the linked data using different linkage keys, Western Australia, 1999–00

Number of records linking	Exact date match		Within 3 days	
	Number	Per cent	Number	Per cent
Hospital records linked to one residential aged care record				
Linkage key = Date of birth, sex and date of separation/admission				
1	3,306	99.8	3,658	99.0
2	6	0.2	38	1.0
Total	*3,312*	*100.0*	*3,696*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and postcode				
1	1,957	99.9	2,052	99.7
2	2	0.1	6	0.3
Total	*1,959*	*100.0*	*2,058*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
1	2,341	99.9	2,454	99.5
2	2	0.1	12	0.5
Total	*2,343*	*100.0*	*2,466*	*100.0*
Residential aged care records linked to one hospital record				
Linkage key = Date of birth, sex and date of separation/admission				
1	3,221	97.3	3,400	92.0
2	88	2.7	290	7.9
3	3	0.1	6	0.2
Total	*3,312*	*100.0*	*3,696*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and postcode				
1	1,947	99.4	2,020	98.2
2	12	0.6	38	1.9
Total	*1,959*	*100.0*	*2,058*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
1	2,329	99.4	2,418	98.1
2	14	0.6	48	2.0
Total	*2,343*	*100.0*	*2,466*	*100.0*
All duplicates				
Linkage key = Date of birth, sex and date of separation/admission				
Unique links	3,215	97.1	3,362	91.0
Non-unique links	97	2.9	334	9.0
Total	**3,312**	**100.0**	**3,696**	**100.0**
Linkage key = Date of birth, sex and date of separation/admission and postcode				
Unique links	1,945	99.3	2,014	97.9
Non-unique links	14	0.7	44	2.1
Total	**1,959**	**100.0**	**2,058**	**100.0**
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
Unique links	2,327	99.3	2,406	97.6
Non-unique links	16	0.7	60	2.4
Total	**2,343**	**100.0**	**2,466**	**100.0**

Note: If a record in one extract links to more than one record in the other extract then the linked database contains records for each link. For example, one residential aged care admission linking to two hospital separations results in two linked records and vice versa.

Table A15: The effect of age on the per cent of unique linkage keys in the linked data, using different linkage keys, Western Australia, 1999–00 (linked records)

Linkage key	65–69	70–74	75–79	80–84	85–89	90–94	95+	Total
Exact date				**Number with unique keys**				
Date of birth and sex	134	329	551	810	853	452	86	3,215
Date of birth, sex and postcode	76	198	319	502	538	257	55	1,945
Date of birth, sex and SLA group	89	236	383	587	636	326	70	2,327
Within 3 days								
Date of birth and sex	151	347	584	839	886	466	89	3,362
Date of birth, sex and postcode	77	205	334	526	549	265	58	2,014
Date of birth, sex and SLA group	91	243	403	611	648	336	74	2,406
Exact date				**Total number of linked records**				
Date of birth and sex	134	335	577	839	883	458	86	3,312
Date of birth, sex and postcode	76	198	321	504	544	261	55	1,959
Date of birth, sex and SLA group	89	236	385	589	644	330	70	2,343
Within 3 days								
Date of birth and sex	161	381	664	935	974	490	91	3,696
Date of birth, sex and postcode	79	205	342	536	567	271	58	2,058
Date of birth, sex and SLA group	93	245	413	625	672	344	74	2,466
Exact date				**Per cent with unique linkage keys**				
Date of birth and sex	100.0	98.2	95.5	96.5	96.6	98.7	100.0	97.1
Date of birth, sex and postcode	100.0	100.0	99.4	99.6	98.9	98.5	100.0	99.3
Date of birth, sex and SLA group	100.0	100.0	99.5	99.7	98.8	98.8	100.0	99.3
Within 3 days								
Date of birth and sex	93.8	91.1	88.0	89.7	91.0	95.1	97.8	91.0
Date of birth, sex and postcode	97.5	100.0	97.7	98.1	96.8	97.8	100.0	97.9
Date of birth, sex and SLA group	97.8	99.2	97.6	97.8	96.4	97.7	100.0	97.6

Table A16: Hospital separation mode for exact date linked data, unlinked data and all hospital data, by linkage key used, Western Australia, 1999–00

| Separation mode | Linked data: type of entry into residential aged care | | | | Unlinked hospital data | All hospital data |
	Permanent admissions	Respite admissions	Return from leave	All linked entries		
				Number		
Linkage key = date of birth, sex and exact day						
To another hospital	23	11	2	36	5,703	5,739
To nursing home	1,014	164	96	1,274	818	2,092
To other health care accommodation	202	258	54	514	474	988
Unknown	—	—	—	—	130	130
Other	354	403	728	1,485	73,050	74,535
All	**1,593**	**836**	**880**	**3,309**	**80,175**	**83,484**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital	13	7	2	22	5,717	5,739
To nursing home	727	126	53	906	1,186	2,092
To other health care accommodation	147	201	40	388	600	988
Unknown	—	—	—	—	130	130
Other	229	309	488	1,026	73,509	74,535
All	**1,116**	**643**	**583**	**2,342**	**81,142**	**83,484**
				Row per cent		
Linkage key = date of birth, sex and exact day						
To another hospital	0.4	0.2	0.0	0.6	99.4	100.0
To nursing home	48.5	7.8	4.6	60.9	39.1	100.0
To other health care accommodation	20.4	26.1	5.5	52.0	48.0	100.0
Unknown	—	—	—	—	100.0	100.0
Other	0.5	0.5	1.0	2.0	98.0	100.0
All	**1.9**	**1.0**	**1.1**	**4.0**	**96.0**	**100.0**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital	0.2	0.1	0.0	0.4	99.6	100.0
To nursing home	34.8	6.0	2.5	43.3	56.7	100.0
To other health care accommodation	14.9	20.3	4.0	39.3	60.7	100.0
Unknown	—	—	—	—	100.0	100.0
Other	0.3	0.4	0.7	1.4	98.6	100.0
All	**1.3**	**0.8**	**0.7**	**2.8**	**97.2**	**100.0**
				Column per cent		
Linkage key = date of birth, sex and exact day						
To another hospital	1.4	1.3	0.2	1.1	7.1	6.9
To nursing home	63.7	19.6	10.9	38.5	1.0	2.5
To other health care accommodation	12.7	30.9	6.1	15.5	0.6	1.2
Unknown	—	—	—	—	0.2	0.2
Other	22.2	48.2	82.7	44.9	91.1	89.3
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital	1.2	1.1	0.3	0.9	7.0	6.9
To nursing home	65.1	19.6	9.1	38.7	1.5	2.5
To other health care accommodation	13.2	31.3	6.9	16.6	0.7	1.2
Unknown	—	—	—	—	0.2	0.2
Other	20.5	48.1	83.7	43.8	90.6	89.3
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2. The linked data in this table is based on the number of unique hospital records linked; excess links have been excluded.

Table A17: Place of assessment for exact date linked and unlinked residential aged care data, by linkage key used, Western Australia, 1999–00

Place of assess-ment	Linked data			Unlinked			All RACS data		
	Permanent	Respite	All	Permanent	Respite	All	Permanent	Respite	All
Number									
Linkage key = date of birth, sex and exact date									
Aged care facility	77	46	123	207	157	364	284	203	487
At home	203	166	369	972	1,675	2,647	1,175	1,841	3,016
Hospital	1,194	580	1,774	744	399	1,143	1,938	979	2,917
Other	99	32	131	116	129	245	215	161	376
Total	**1,573**	**824**	**2,397**	**2,039**	**2,360**	**4,399**	**3,612**	**3,184**	**6,796**
Linkage key = date of birth, sex, exact date and SLA group									
Aged care facility	39	56	95	245	147	392	284	203	487
At home	123	148	271	1,052	1,693	2,745	1,175	1,841	3,016
Hospital	457	853	1,310	1,481	126	1,607	1,938	979	2,917
Other	21	58	79	194	103	297	215	161	376
Total	**640**	**1,115**	**1,755**	**2,972**	**2,069**	**5,041**	**3,612**	**3,184**	**6,796**
Per cent									
Linkage key = date of birth, sex and exact date									
Aged care facility	4.9	5.6	5.1	10.2	6.7	8.3	7.9	6.4	7.2
At home	12.9	20.1	15.4	47.7	71.0	60.2	32.5	57.8	44.4
Hospital	75.9	70.4	74.0	36.5	16.9	26.0	53.7	30.7	42.9
Other	6.3	3.9	5.5	5.7	5.5	5.6	6.0	5.1	5.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, exact date and SLA group									
Aged care facility	6.1	5.0	5.4	8.2	7.1	7.8	7.9	6.4	7.2
At home	19.2	13.3	15.4	35.4	81.8	54.5	32.5	57.8	44.4
Hospital	71.4	76.5	74.6	49.8	6.1	31.9	53.7	30.7	42.9
Other	3.3	5.2	4.5	6.5	5.0	5.9	6.0	5.1	5.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2. Admissions to residential aged care relating to hospital leave have been excluded.

3. The linked data in this table is based on the number of unique residential aged care records linked; excess links have been excluded.

Table A18: Comparison of marital status in hospital data and marital status in aged care data by exact date linkage key used, linked data set, Western Australia, 1999–00

Residential aged care	Never married	Married including de facto	Widowed	Divorced or separated	Not stated	All
			Hospital morbidity data			
			Number			
Linkage key = date of birth, sex and exact date						
Never married	193	6	15	3	14	231
Married including de facto	6	783	50	9	8	856
Widowed	31	176	1,681	70	55	2,013
Divorced or separated	24	23	29	119	3	198
Unknown	5	4	5	—	—	14
All	**259**	**992**	**1,780**	**201**	**80**	**3,312**
Linkage key = date of birth, sex, exact date and SLA group						
Never married	136	1	6	3	7	153
Married including de facto	1	584	31	4	6	626
Widowed	22	109	1,195	54	42	1,422
Divorced or separated	16	13	17	83	1	130
Unknown	4	4	4	—	—	12
All	**179**	**711**	**1,253**	**144**	**56**	**2,343**
			Per cent			
Linkage key = date of birth, sex and exact date						
Never married	5.8	0.2	0.5	0.1	0.4	7.0
Married including de facto	0.2	23.6	1.5	0.3	0.2	25.8
Widowed	0.9	5.3	50.8	2.1	1.7	60.8
Divorced or separated	0.7	0.7	0.9	3.6	0.1	6.0
Unknown	0.2	0.1	0.2	—	—	0.4
All	**7.8**	**30.0**	**53.7**	**6.1**	**2.4**	**100.0**
Linkage key = date of birth, sex, exact date and SLA group						
Never married	5.8	0.0	0.3	0.1	0.3	6.5
Married including de facto	0.0	24.9	1.3	0.2	0.3	26.7
Widowed	0.9	4.7	51.0	2.3	1.8	60.7
Divorced or separated	0.7	0.6	0.7	3.5	0.0	5.5
Unknown	0.2	0.2	0.2	—	—	0.5
All	**7.6**	**30.3**	**53.5**	**6.1**	**2.4**	**100.0**

Note: SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

Appendix 3 Tables for South Australia

Table A19: Duplicates in the residential aged care extract using different linkage keys, by type of resident, South Australia, 1999–00 (admissions, number and per cent)

Linkage key	Permanent	Respite	Leave	All	Permanent	Respite	Leave	All
	Number				**Per cent**			
Exact dates								
Linkage key = Date of birth, sex and admission date								
Unique	4,143	3,474	1,266	8,829	99.9	99.8	100.0	99.3
2	2	6	—	62	0.1	0.2	—	0.7
All	**4,145**	**3,480**	**1,266**	**8,891**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex admission date and postcode								
Unique	4,145	3,480	1,266	8,847	100.0	100.0	100.0	99.5
2	—	—	—	44	—	—	—	0.5
All	**4,145**	**3,480**	**1,266**	**8,891**	**100.0**	**100.0**	**100.0**	**100.0**
Within 3 days								
Linkage key = Date of birth, sex and admission date								
Unique	4,137	3,465	1,262	8,794	99.8	99.6	99.7	98.9
2	8	15	4	97	0.2	0.4	0.3	1.1
All	**4,145**	**3,480**	**1,266**	**8,891**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex admission date and postcode								
Unique	4,145	3,480	1,262	8,742	100.0	100.0	99.7	98.3
2	—	—	4	149	—	—	0.3	1.7
All	**4,145**	**3,480**	**1,266**	**8,891**	**100.0**	**100.0**	**100.0**	**100.0**

Note: Duplicates among 'All' records include cases with the same linkage key but a different type of resident entry. Consequently the number of unique linkage keys among 'All' records is larger than the sum of the duplicates in the three resident entry types.

Table A20: Duplicates in the hospital morbidity extract using different linkage keys, South Australia, 1999–00 (separations)

	Linkage key					
	Date of birth and sex only		**Date of birth, sex and postcode**		**Date of birth, sex and SLA**	
Number of duplicates	**Exact date**	**Within 3 days**	**Exact date**	**Within 3 days**	**Exact date**	**Within 3 days**
	Number					
Unique	93,750	88,611	95,172	93,780	95,154	93,728
2	1,602	6,442	192	1,561	210	1,613
3	12	294	—	23	—	23
4	—	17	—	—	—	—
All	**95,364**	**95,364**	**95,364**	**95,364**	**95,364**	**95,364**
	Per cent					
Unique	98.3	92.9	99.8	98.3	99.8	98.3
2	1.7	6.8	0.2	1.6	0.2	1.7
3	0.0	0.3	—	0.0	—	0.0
4	—	0.0	—	—	—	—
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Note: SLA is derived from postcode and SLA data provided in the hospital morbidity data—see footnote 4.

Table A21: The effect of age on the per cent of unique linkage keys in the hospital morbidity data, using different linkage keys, South Australia, 1999–00

Linkage key	65–69	70–74	75–79	80–84	85–89	90–94	95+	All
Exact date			Number with unique linkage keys					
Date of birth and sex	16,145	20,928	22,887	16,985	11,650	4,281	874	93,750
Date of birth, sex and postcode	16,363	21,272	23,329	17,237	11,782	4,313	876	95,172
Date of birth, sex and SLA	16,355	21,260	23,331	17,235	11,784	4,313	876	95,154
Within 3 days								
Date of birth and sex	15,362	19,598	21,383	16,074	11,140	4,189	865	88,611
Date of birth, sex and postcode	16,122	20,929	22,948	16,996	11,655	4,260	870	93,780
Date of birth, sex and SLA	16,111	20,891	22,948	16,990	11,653	4,261	874	93,728
All records	**16,423**	**21,314**	**23,379**	**17,261**	**11,794**	**4,317**	**876**	**95,364**
Exact date			Per cent with unique linkage keys					
Date of birth and sex	98.3	98.2	97.9	98.4	98.8	99.2	99.8	98.3
Date of birth, sex and postcode	99.6	99.8	99.8	99.9	99.9	99.9	100.0	99.8
Date of birth, sex and SLA	99.6	99.7	99.8	99.8	99.9	99.9	100.0	99.8
Within 3 days								
Date of birth and sex	93.5	91.9	91.5	93.1	94.5	97.0	98.7	92.9
Date of birth, sex and postcode	98.2	98.2	98.2	98.5	98.8	98.7	99.3	98.3
Date of birth, sex and SLA	98.1	98.0	98.2	98.4	98.8	98.7	99.8	98.3

Note: SLA is derived from postcode and SLA data provided in the hospital morbidity data—see footnote 4.

Table A22: Duplicates in the linked data using different linkage keys, South Australia, 1999–00

Number of records linking	Exact date match		Within 3 days	
	Number	Per cent	Number	Per cent
Hospital records linked to one residential aged care record				
Linkage key = Date of birth, sex and date of separation/admission				
1	3,648	98.7	4,089	97.9
2	50	1.4	88	2.1
Total	*3,698*	*100.0*	*4,177*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and postcode				
1	2,428	98.7	2,522	98.2
2	32	1.3	46	1.8
Total	*2,460*	*100.0*	*2,568*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
1	2,860	98.8	2,992	98.2
2	34	1.2	54	1.8
Total	*2,894*	*100.0*	*3,046*	*100.0*
Residential aged care records linked to one hospital record				
Linkage key = Date of birth, sex and date of separation/admission				
1	3,603	97.4	3,758	90.0
2	92	2.5	376	9.0
3	3	0.1	39	0.9
4	—	—	4	0.1
Total	*3,698*	*100.0*	*4,177*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and postcode				
1	2,452	99.7	2,516	98.0
2	8	0.3	52	2.0
Total	*2,460*	*100.0*	*2,568*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
1	2,886	99.7	2,972	97.6
2	8	0.3	74	2.4
Total	*2,894*	*100.0*	*3,046*	*100.0*
All duplicates				
Linkage key = Date of birth, sex and date of separation/admission				
Unique links	3,553	96.2	3,674	88.9
Non-unique links	145	3.8	503	11.1
Total	**3,698**	**100.0**	**4,177**	**100.0**
Linkage key = Date of birth, sex and date of separation/admission and postcode				
Unique links	2,420	99.7	2,470	98.0
Non-unique links	40	0.3	98	2.0
Total	**2,460**	**100.0**	**2,568**	**100.0**
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
Unique links	2,852	99.7	2,918	97.6
Non-unique links	42	0.3	128	2.4
Total	**2,894**	**100.0**	**3,046**	**100.0**

Note: If a record in one extract links to more than one record in the other extract then the linked database contains records for each link. For example, one residential aged care admission linking to two hospital separations results in two linked records and vice versa.

Table A23: The effect of age on the per cent of unique linkage keys in the linked data, using different linkage keys, South Australia, 1999–00

Linkage key	65–69	70–74	75–79	80–84	85–89	90–94	95+	Total
Exact date				Number with unique keys				
Date of birth and sex	123	293	707	868	964	480	118	3,553
Date of birth, sex and postcode	74	187	495	577	669	331	87	2,420
Date of birth, sex and SLA group	94	226	585	679	779	391	98	2,852
Within 3 days								
Date of birth and sex	129	313	747	889	983	489	120	3,670
Date of birth, sex and postcode	76	190	508	590	677	341	88	2,470
Date of birth, sex and SLA group	99	229	608	693	789	401	99	2,918
Exact date				Total number of linked records				
Date of birth and sex	131	303	760	896	996	494	118	3,698
Date of birth, sex and postcode	76	187	509	581	679	341	87	2,460
Date of birth, sex and SLA group	96	226	599	685	789	401	98	2,894
Within 3 days								
Date of birth and sex	146	354	898	1,038	1,084	533	124	4,177
Date of birth, sex and postcode	78	192	540	616	693	359	90	2,568
Date of birth, sex and SLA group	101	235	640	735	813	421	101	3,046
Exact date				Per cent with unique linkage keys				
Date of birth and sex	93.9	96.7	93.0	96.9	96.8	97.2	100.0	96.1
Date of birth, sex and postcode	97.4	100.0	97.2	99.3	98.5	97.1	100.0	98.4
Date of birth, sex and SLA group	97.9	100.0	97.7	99.1	98.7	97.5	100.0	98.5
Within 3 days								
Date of birth and sex	88.4	88.4	83.2	85.6	90.7	91.7	96.8	87.9
Date of birth, sex and postcode	97.4	99.0	94.1	95.8	97.7	95.0	97.8	96.2
Date of birth, sex and SLA group	98.0	97.4	95.0	94.3	97.0	95.2	98.0	95.8

Table A24: Hospital separation mode for exact date linked data, unlinked data and all hospital data, by linkage key used, South Australia, 1999–00

Separation mode	Linked data: type of entry into residential aged care				Unlinked hospital data	All hospital data
	Permanent admissions	Respite admissions	Return from leave	All linked entries		
Number						
Linkage key = date of birth, sex and exact day						
To another hospital/other health care accommodation	78	58	46	182	9,046	9,228
To nursing home	1,356	822	502	2,680	5,044	7,724
Unknown	5	13	6	24	427	451
Other	232	211	344	787	77174	77961
All	**1,671**	**1,104**	**898**	**3,673**	**91,691**	**95,364**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital/other health care accommodation	62	43	36	141	9,087	9,228
To nursing home	1,122	689	366	2,177	5,547	7,724
Unknown	3	6	3	12	439	451
Other	150	146	251	547	77414	77961
All	**1,337**	**884**	**656**	**2,877**	**92,487**	**95,364**
Row per cent						
Linkage key = date of birth, sex and exact day						
To another hospital/other health care accommodation	0.8	0.6	0.5	2.0	98.0	100.0
To nursing home	17.6	10.6	6.5	34.7	65.3	100.0
Unknown	1.1	2.9	1.3	5.3	94.7	100.0
Other	0.3	0.3	0.4	1.0	99.0	100.0
All	**1.8**	**1.2**	**0.9**	**3.9**	**96.1**	**100.0**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital/other health care accommodation	0.7	0.5	0.4	1.5	98.5	100.0
To nursing home	14.5	8.9	4.7	28.2	71.8	100.0
Unknown	0.7	1.3	0.7	2.7	97.3	100.0
Other	0.2	0.2	0.3	0.7	99.3	100.0
All	**1.4**	**0.9**	**0.7**	**3.0**	**97.0**	**100.0**
Column per cent						
Linkage key = date of birth, sex and exact day						
To another hospital/other health care accommodation	4.7	5.3	5.1	5.0	9.9	9.7
To nursing home	81.1	74.5	55.9	73.0	5.5	8.1
Unknown	0.3	1.2	0.7	0.7	0.5	0.5
Other	13.9	19.1	38.3	21.4	84.2	81.8
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital/other health care accommodation	4.6	4.9	5.5	4.9	9.8	9.7
To nursing home	83.9	77.9	55.8	75.7	6.0	8.1
Unknown	0.2	0.7	0.5	0.4	0.5	0.5
Other	11.2	16.5	38.3	19.0	83.7	81.8
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2. Modes of separation 'to another hospital' and to other health care accommodation' have been combined in this table due to errors in some of the source data that could not be corrected in time for this study. Other modes of separation were not affected.

3. The linked data in this table is based on the number of unique hospital records linked; excess links have been excluded.

Table A25: Place of assessment for exact date linked and unlinked residential aged care data, by linkage key used, South Australia, 1999–00

Place of assess- ment	Linked data			Unlinked			All RACS data		
	Permanent	Respite	All	Permanent	Respite	All	Permanent	Respite	All
Number									
Linkage key = date of birth, sex and exact date									
Aged care facility	127	66	193	277	124	401	404	190	594
At home	265	252	517	1,173	1,771	2,944	1,438	2,023	3,461
Hospital	1,210	728	1,938	852	336	1,188	2,062	1,064	3,126
Other	50	40	90	191	163	354	241	203	444
Total	**1,652**	**1,086**	**2,738**	**2,493**	**2,394**	**4,887**	**4,145**	**3,480**	**7,625**
Linkage key = date of birth, sex, exact date and SLA group									
Aged care facility	109	51	160	295	139	434	404	190	594
At home	221	197	418	1,217	1,826	3,043	1,438	2,023	3,461
Hospital	972	609	1,581	1,090	455	1,545	2,062	1,064	3,126
Other	35	25	60	206	178	384	241	203	444
Total	**1,337**	**882**	**2,219**	**2,808**	**2,598**	**5,406**	**4,145**	**3,480**	**7,625**
Per cent									
Linkage key = date of birth, sex and exact date									
Aged care facility	7.7	6.1	7.0	11.1	5.2	8.2	9.7	5.5	7.8
At home	16.0	23.2	18.9	47.1	74.0	60.2	34.7	58.1	45.4
Hospital	73.2	67.0	70.8	34.2	14.0	24.3	49.7	30.6	41.0
Other	3.0	3.7	3.3	7.7	6.8	7.2	5.8	5.8	5.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, exact date and SLA group									
Aged care facility	8.2	5.8	7.2	10.5	5.4	8.0	9.7	5.5	7.8
At home	16.5	22.3	18.8	43.3	70.3	56.3	34.7	58.1	45.4
Hospital	72.7	69.0	71.2	38.8	17.5	28.6	49.7	30.6	41.0
Other	2.6	2.8	2.7	7.3	6.9	7.1	5.8	5.8	5.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2. Admissions to residential aged care relating to hospital leave have been excluded.

3. The linked data in this table is based on the number of unique residential aged care records linked; excess links have been excluded.

Table A26: Comparison of marital status in hospital data and marital status in aged care data by exact date linkage key used, linked data set, South Australia, 1999–00

Residential aged care	Hospital morbidity data					
	Never married	Married including de facto	Widowed	Divorced or separated	Not stated	All
Number						
Linkage key = date of birth, sex and exact date						
Never married	5	—	—	—	274	279
Married including de facto	1	12	—	14	1,016	1,043
Widowed	—	44	11	—	2,176	2,231
Divorced or separated	—	1	1	3	119	124
Unknown	—	—	—	—	21	21
All	**6**	**57**	**12**	**17**	**3,606**	**3,698**
Linkage key = date of birth, sex, exact date and SLA group						
Never married	3	—	—	—	205	208
Married including de facto	—	8	—	11	840	859
Widowed	—	25	7	—	1,691	1,723
Divorced or separated	—	1	—	2	88	91
Unknown	—	—	—	—	13	13
All	**3**	**34**	**7**	**13**	**2,837**	**2,894**
Per cent						
Linkage key = date of birth, sex and exact date						
Never married	0.1	—	—	—	7.4	7.5
Married including de facto	0.0	0.3	—	0.4	27.5	28.2
Widowed	—	1.2	0.3	—	58.8	60.3
Divorced or separated	—	0.0	0.0	0.1	3.2	3.4
Unknown	—	—	—	—	0.6	0.6
All	**0.2**	**1.5**	**0.3**	**0.5**	**97.5**	**100.0**
Linkage key = date of birth, sex, exact date and SLA group						
Never married	0.1	—	—	—	7.1	7.2
Married including de facto	—	0.3	—	0.4	29.0	29.7
Widowed	—	0.9	0.2	—	58.4	59.5
Divorced or separated	—	0.0	—	0.1	3.0	3.1
Unknown	—	—	—	—	0.4	0.4
All	**0.1**	**1.2**	**0.2**	**0.4**	**98.0**	**100.0**

Note: SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

Appendix 4 Tables for Tasmania

Table A27: Duplicates in the residential aged care extract using different linkage keys, by type of resident, Tasmania, 1999–00 (admissions, number and per cent)

Linkage key	Permanent	Respite	Leave	All	Permanent	Respite	Leave	All
	Number				**Per cent**			
Exact dates								
Linkage key = Date of birth, sex and admission date								
Unique	1,062	1,306	166	2,534	100.0	100.0	100.0	100.0
All	**1,062**	**1,306**	**166**	**2,534**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex admission date and postcode								
Unique	1,062	1,306	166	2,534	100.0	100.0	100.0	100.0
All	**1,062**	**1,306**	**166**	**2,534**	**100.0**	**100.0**	**100.0**	**100.0**
Within 3 days								
Linkage key = Date of birth, sex and admission date								
Unique	1,062	1,306	166	2,526	100.0	100.0	100.0	99.7
2	—	—	—	8	—	—	—	0.3
All	**1,062**	**1,306**	**166**	**2,534**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = Date of birth, sex admission date and postcode								
Unique	1,062	1,306	166	2,527	100.0	100.0	100.0	99.7
2	—	—	—	7	—	—	—	0.3
All	**1,062**	**1,306**	**166**	**2,534**	**100.0**	**100.0**	**100.0**	**100.0**

Note: Duplicates among 'All' records include cases with the same linkage key but a different type of resident entry. Consequently the number of unique linkage keys among 'All' records is larger than the sum of the duplicates in the three resident entry types.

Table A28: Duplicates in the hospital morbidity extract using different linkage keys, Tasmania, 1999–00 (separations)

	Linkage key					
	Date of birth and sex only		Date of birth, sex and postcode		Date of birth, sex and SLA	
Number of duplicates	Exact date	Within 3 days	Exact date	Within 3 days	Exact date	Within 3 days
Number						
Unique	21,893	21,436	21,959	21,711	21,949	21,705
2	98	542	32	276	42	280
3	—	13	—	4	—	6
All	**21,991**	**21,991**	**21,991**	**21,991**	**21,991**	**21,991**
Per cent						
Unique	99.6	97.5	99.9	98.7	99.8	98.7
2	0.4	2.5	0.1	1.3	0.2	1.3
3	—	0.1	—	0.0	—	0.0
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Note: SLA is derived from postcode and SLA data provided in the hospital morbidity data—see footnote 4.

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Table A29: The effect of age on the per cent of unique linkage keys in the hospital morbidity data, using different linkage keys, Tasmania, 1999–00

Linkage key	65–69	70–74	75–79	80–84	85–89	90–94	95+	All
Exact date			**Number with unique linkage keys**					
Date of birth and sex	4,124	4,989	5,427	3,966	2,491	753	143	21,893
Date of birth, sex and postcode	4,136	5,001	5,445	3,986	2,495	753	143	21,959
Date of birth, sex and SLA	4,136	5,001	5,441	3,982	2,493	753	143	21,949
Within 3 days								
Date of birth and sex	4,039	4,861	5,301	3,886	2,459	748	142	21,436
Date of birth, sex and postcode	4,081	4,935	5,393	3,940	2,471	749	142	21,711
Date of birth, sex and SLA	4,083	4,934	5,388	3,938	2,471	749	142	21,705
All records	**4,138**	**5,011**	**5,455**	**3,996**	**2,495**	**753**	**143**	**21,991**
Exact date			**Per cent with unique linkage keys**					
Date of birth and sex	99.7	99.6	99.5	99.2	99.8	100.0	100.0	99.6
Date of birth, sex and postcode	100.0	99.8	99.8	99.7	100.0	100.0	100.0	99.9
Date of birth, sex and SLA	100.0	99.8	99.7	99.6	99.9	100.0	100.0	99.8
Within 3 days								
Date of birth and sex	97.6	97.0	97.2	97.2	98.6	99.3	99.3	97.5
Date of birth, sex and postcode	98.6	98.5	98.9	98.6	99.0	99.5	99.3	98.7
Date of birth, sex and SLA	98.7	98.5	98.8	98.5	99.0	99.5	99.3	98.7

Note: SLA is derived from postcode and SLA data provided in the hospital morbidity data—see footnote 4.

Table A30: Duplicates in the linked data using different linkage keys, Tasmania, 1999–00

Number of records linking	Exact date match		Within 3 days	
	Number	**Per cent**	**Number**	**Per cent**
Hospital records linked to one residential aged care record				
Linkage key = Date of birth, sex and date of separation/admission				
1	602	100.0	666	99.7
2	—	0.0	2	0.3
Total	*602*	*100.0*	*668*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and postcode				
1	394	100.0	429	100.0
Total	*394*	*100.0*	*429*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
1	484	100.0	525	100.0
Total	*484*	*100.0*	*525*	*100.0*
Residential aged care records linked to one hospital record				
Linkage key = Date of birth, sex and date of separation/admission				
1	596	99.0	648	97.0
2	6	1.0	20	3.0
Total	*602*	*100.0*	*668*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and postcode				
1	394	100.0	423	98.6
2	—	0.0	6	1.4
Total	*394*	*100.0*	*429*	*100.0*
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
1	484	100.0	519	98.9
2	—	0.0	6	1.1
Total	*484*	*100.0*	*525*	*100.0*
All duplicates				
Linkage key = Date of birth, sex and date of separation/admission				
Unique links	596	99.0	646	96.7
Non-unique links	6	1.0	22	3.3
Total	**602**	**100.0**	**668**	**100.0**
Linkage key = Date of birth, sex and date of separation/admission and postcode				
Unique links	394	100.0	423	98.6
Non-unique links	—	—	6	1.4
Total	**394**	**100.0**	**429**	**100.0**
Linkage key = Date of birth, sex and date of separation/admission and SLA group				
Unique links	484	100.0	519	98.9
Non-unique links	—	—	6	1.1
Total	**484**	**100.0**	**525**	**100.0**

Note: If a record in one extract links to more than one record in the other extract then the linked database contains records for each link. For example, one residential aged care admission linking to two hospital separations results in two linked records and vice versa.

Table A31: The effect of age on the per cent of unique linkage keys in the linked data, using different linkage keys, Tasmania, 1999–00 (linked records)

Linkage key	65–69	70–74	75–79	80–84	85–89	90–94	95+	Total
Exact date				**Number with unique keys**				
Date of birth and sex	19	54	126	152	161	70	14	596
Date of birth, sex and postcode	14	37	87	91	106	49	10	394
Date of birth, sex and SLA group	14	46	104	115	134	58	13	484
Within 3 days								
Date of birth and sex	19	56	139	166	180	71	15	646
Date of birth, sex and postcode	14	39	96	98	115	51	10	423
Date of birth, sex and SLA group	14	48	114	124	145	60	14	519
Exact date				**Total number of linked records**				
Date of birth and sex	19	54	128	154	163	70	14	602
Date of birth, sex and postcode	14	37	87	91	106	49	10	394
Date of birth, sex and SLA group	14	46	104	115	134	58	13	484
Within 3 days								
Date of birth and sex	19	60	145	172	182	75	15	668
Date of birth, sex and postcode	14	41	98	100	115	51	10	429
Date of birth, sex and SLA group	14	50	116	126	145	60	14	525
Exact date				**Per cent with unique linkage keys**				
Date of birth and sex	100.0	100.0	98.4	98.7	98.8	100.0	100.0	99.0
Date of birth, sex and postcode	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Date of birth, sex and SLA group	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Within 3 days								
Date of birth and sex	100.0	93.3	95.9	96.5	98.9	94.7	100.0	96.7
Date of birth, sex and postcode	100.0	95.1	98.0	98.0	100.0	100.0	100.0	98.6
Date of birth, sex and SLA group	100.0	96.0	98.3	98.4	100.0	100.0	100.0	98.9

Table A32: Hospital separation mode for exact date linked data, unlinked data and all hospital data, by linkage key used, Tasmania, 1999–00

Separation mode	Permanent admissions	Respite admissions	Return from leave	All linked entries	Unlinked hospital data	All hospital data
	Linked data: type of entry into residential aged care					
	Number					
Linkage key = date of birth, sex and exact day						
To another hospital	34	7	11	52	1,790	1,842
To nursing home	280	23	30	333	464	797
To other health care accommodation	22	8	7	37	1,493	1,530
Unknown	2	1	1	4	107	111
Other	77	35	64	176	17,535	17,711
All	**415**	**74**	**113**	**602**	**21,389**	**21,991**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital	28	6	7	41	1,801	1,842
To nursing home	228	20	26	274	523	797
To other health care accommodation	21	8	7	36	1,494	1,530
Unknown	2	1	1	4	107	111
Other	53	29	47	129	17,582	17,711
All	**332**	**64**	**88**	**484**	**21,507**	**21,991**
	Row per cent					
Linkage key = date of birth, sex and exact day						
To another hospital	1.8	0.4	0.6	2.8	97.2	100.0
To nursing home	35.1	2.9	3.8	41.8	58.2	100.0
To other health care accommodation	1.4	0.5	0.5	2.4	97.6	100.0
Unknown	1.8	0.9	0.9	3.6	96.4	100.0
Other	0.4	0.2	0.4	1.0	99.0	100.0
All	**1.9**	**0.3**	**0.5**	**2.7**	**97.3**	**100.0**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital	1.5	0.3	0.4	2.2	97.8	100.0
To nursing home	28.6	2.5	3.3	34.4	65.6	100.0
To other health care accommodation	1.4	0.5	0.5	2.4	97.6	100.0
Unknown	1.8	0.9	0.9	3.6	96.4	100.0
Other	0.3	0.2	0.3	0.7	99.3	100.0
All	**1.5**	**0.3**	**0.4**	**2.2**	**97.8**	**100.0**
	Column per cent					
Linkage key = date of birth, sex and exact day						
To another hospital	8.2	9.5	9.7	8.6	8.4	8.4
To nursing home	67.5	31.1	26.5	55.3	2.2	3.6
To other health care accommodation	5.3	10.8	6.2	6.1	7.0	7.0
Unknown	0.5	1.4	0.9	0.7	0.5	0.5
Other	18.6	47.3	56.6	29.2	82.0	80.5
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, exact day and SLA group						
To another hospital	8.4	9.4	8.0	8.5	8.4	8.4
To nursing home	68.7	31.3	29.5	56.6	2.4	3.6
To other health care accommodation	6.3	12.5	8.0	7.4	6.9	7.0
Unknown	0.6	1.6	1.1	0.8	0.5	0.5
Other	16.0	45.3	53.4	26.7	81.8	80.5
All	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2. The linked data in this table is based on the number of unique hospital records linked; excess links have been excluded.

Table A33: Place of assessment for exact date linked and unlinked residential aged care data, by linkage key used, Tasmania, 1999–00

Place of assess-ment	Linked data			Unlinked			All RACS data		
	Permanent	Respite	All	Permanent	Respite	All	Permanent	Respite	All
Number									
Linkage key = date of birth, sex and exact date									
Aged care facility	10	5	15	55	31	86	65	36	101
At home	95	42	137	388	1,012	1,400	483	1,054	1,537
Hospital	295	23	318	147	105	252	442	128	570
Other	12	4	16	60	84	144	72	88	160
Total	**412**	**74**	**486**	**650**	**1,232**	**1,882**	**1,062**	**1,306**	**2,368**
Linkage key = date of birth, sex, exact date and SLA group									
Aged care facility	7	2	9	58	34	92	65	36	101
At home	81	38	119	402	1,016	1,418	483	1,054	1,537
Hospital	235	21	256	207	107	314	442	128	570
Other	9	3	12	63	85	148	72	88	160
Total	**332**	**64**	**396**	**730**	**1,242**	**1,972**	**1,062**	**1,306**	**2,368**
Per cent									
Linkage key = date of birth, sex and exact date									
Aged care facility	2.4	6.8	3.1	8.5	2.5	4.6	6.1	2.8	4.3
At home	23.1	56.8	28.2	59.7	82.1	74.4	45.5	80.7	64.9
Hospital	71.6	31.1	65.4	22.6	8.5	13.4	41.6	9.8	24.1
Other	2.9	5.4	3.3	9.2	6.8	7.7	6.8	6.7	6.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Linkage key = date of birth, sex, exact date and SLA group									
Aged care facility	2.1	3.1	2.3	7.9	2.7	4.7	6.1	2.8	4.3
At home	24.4	59.4	30.1	55.1	81.8	71.9	45.5	80.7	64.9
Hospital	70.8	32.8	64.6	28.4	8.6	15.9	41.6	9.8	24.1
Other	2.7	4.7	3.0	8.6	6.8	7.5	6.8	6.7	6.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

2. Admissions to residential aged care relating to hospital leave have been excluded.

3. The linked data in this table is based on the number of unique residential aged care records linked; excess links have been excluded.

Table A34: Comparison of marital status in hospital data and marital status in aged care data by exact date linkage key used, linked data set, Tasmania, 1999–00

Residential aged care	Never married	Married including de facto	Widowed	Divorced or separated	Not stated	All
			Hospital morbidity data			
			Number			
Linkage key = date of birth, sex and exact date						
Never married	—	—	—	—	37	37
Married including de facto	1	7	—	—	174	182
Widowed	2	—	5	—	352	359
Divorced or separated	—	1	—	—	23	24
Unknown	—	—	—	—	—	—
All	**3**	**8**	**5**	**—**	**586**	**602**
Linkage key = date of birth, sex, exact date and SLA group						
Never married	—	—	—	—	30	30
Married including de facto	—	6	—	—	144	150
Widowed	1	—	4	—	280	285
Divorced or separated	—	—	—	—	19	19
Unknown	—	—	—	—	—	—
All	**1**	**6**	**4**	**—**	**473**	**484**
			Per cent			
Linkage key = date of birth, sex and exact date						
Never married	—	—	—	—	6.1	6.1
Married including de facto	0.2	1.2	—	—	28.9	30.2
Widowed	0.3	—	0.8	—	58.5	59.6
Divorced or separated	—	0.2	—	—	3.8	4.0
Unknown	—	—	—	—	—	—
All	**0.5**	**1.3**	**0.8**	**—**	**97.3**	**100.0**
Linkage key = date of birth, sex, exact date and SLA group						
Never married	—	—	—	—	6.2	6.2
Married including de facto	—	1.2	—	—	29.8	31.0
Widowed	0.2	—	0.8	—	57.9	58.9
Divorced or separated	—	—	—	—	3.9	3.9
Unknown	—	—	—	—	—	—
All	**0.2**	**1.2**	**0.8**	**—**	**97.7**	**100.0**

Note: SLA group is derived from postcode. For a particular postcode, the corresponding SLA group includes all SLAs which have some residents in that postcode.

Appendix 5 The data

A5.1 Hospital morbidity data

List of extract variables

- Date of birth
- Sex
- Postcode of usual residence
- SLA of usual residence
- State of usual residence
- Date of admission
- Date of separation
- Mode of separation
- Referral source
- Sector (public/private hospital)
- Usual accommodation type (new field in 1999–00 data, for mental health NMDS)
- State of hospitalisation
- Episode type (acute, rehabilitation, etc)
- RRMA for client's usual residence
- RRMA for the hospital
- DRG
- Principal and additional diagnoses
- Procedures
- Marital status (mainly for mental health NMDS only)
- Record number

Table A35: Exclusions from hospital morbidity data, by State 1999–00 (number of separations)

	NSW/ACT	WA	SA	Tas
Separations excluded				
Persons with 1 January birth dates	3,505	942	1,035	276
Statistical discharges	14,548	1,912	2,741	1,222
Patient died in hospital	19,487	4,318	4,887	1,101
Same day hospital separations	290,184	74,425	74,360	16,473
Total excluded	*323,917*	*80,751*	*82,048*	*18,649*
Separations retained	*328,220*	*83,484*	*95,364*	*21,991*
Total hospital separations for people aged 65+	**652,137**	**164,235**	**177,412**	**40,640**

A5.2 Residential aged care data

List of extract variables
- Date of birth
- Sex
- Marital status
- Postcode of usual residence
- Postcode/SLA for residential care facility
- State of usual residence
- State of aged care facility
- Date of discharge from residential care
- Date of admission to residential care
- Type of entry
- Leave start date
- Leave return date
- Reason for leave
- Reason for discharge
- Dependency level (RCS level)
- RCS items used to calculate RCS score
- Place of assessment
- Date of assessment

Glossary

ABS	Australian Bureau of Statistics
Administrative by-product data	Data collected during the administration of a program, rather than collected solely for the purposes of statistical reporting.
AIHW	Australian Institute of Health and Welfare
Demographic data	Data describing the characteristics of a person (for example, age, sex, marital status)
Diagnostic data	Data related to the medical condition of a patient.
DRG	Diagnosis Related Group (DRG) is a patient classification scheme which provides a clinically meaningful way of relating the number and types of patients treated in a hospital to the resources required by the hospital.
Duplicate linkage key	A duplicate (or 'non-unique') key is one where more than one record on the database contains a specific combination of the variables in the *linkage key*.
Episode of care (hospital)	A phase of treatment for an admitted patient. It may correspond to a patient's entire hospital stay, or the hospital stay may be divided into separate episodes of care of different types, such as acute care, palliative care and rehabilitation care.
HACC	Home and Community Care program.
HACC linkage key	The *linkage key* used in the Home and Community Care National Minimum Data Set, comprising the 2nd, 3rd and 5th letters of the surname, the 2nd and 3rd letters of the first name, sex and date of birth.
Hospital morbidity data	The NMDS for Admitted patient care (hospital)
ICD–10–AM	The international statistical classification of diseases and related health problems, 10th revision, Australian modification.
Linkage key	The combination of variables used to identify individual records; for example data of birth, sex, location of usual residence of an individual and date of admission. Name may be included in a linkage key.
NCSDD	*National Community Services Data Dictionary*
NCSIMG	National Community Services Information Management Group
NHDD	*National Health Data Dictionary*
NHIMG	National Health Information Management Group
NMDS	National Minimum Data Set
Provision ratio	Number of residential aged care places per 1,000 population aged 70 and over.

Same day separation	An *episode of care* in which the patient is admitted and discharged from hospital on the same day.
Separation (hospital)	The term used to refer to the *episode of care* in hospital, which can be a total hospital stay, or a portion of a hospital stay beginning in a change of type of care (for example from acute to rehabilitation). 'Separation' also means the process by which an admitted patient completes an *episode of care* by being discharged, dying, transferring to another hospital or changing type of care.
SLA	Statistical local area
SLA group	*SLA group* is based on postcode. For a particular postcode, the corresponding *SLA* group includes all *SLA*s which have some residents in that postcode. Because of this, *SLA* groups may be larger than a single *SLA* and may overlap.
SLA of usual residence (hospital morbidity data)	*SLA of usual residence* in the hospital morbidity data extract is based on postcode or *SLA* data provided for the hospital morbidity data, depending on which information was available and where the *SLA* data may relate to out-of-date *SLA* boundaries. Postcodes and *SLA* from previous versions are assigned to current *SLAs* with probability equal to the proportion of the postcode's, or old *SLA's*, population that live within a particular current *SLA*.
Statistical discharge (hospital)	In a *statistical discharge* the patient changes from one *episode of care* to another (e.g. acute care to rehabilitation).
Unique linkage key	A *linkage key* where there is only one instance of the specific combination of variables on the database.

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