

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.

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

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.