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Contents

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Abbreviations

_	in a key description indicates that the component is not included in the match key
ACAP	Aged Care Assessment Program
ACAT	Aged Care Assessment Team
AIHW	Australian Institute of Health and Welfare
CACP	Community Aged Care Package
dmob	day and month of birth
DoHA	Department of Health and Ageing
EACH	Extended Aged Care at Home
EACH(D)	EACH and/or EACHD
EACHD	Extended Aged Care at Home Dementia
FMR	false match rate
g2	the 2nd and 3rd letters of the given name substituting '2' for short names
HACC	Home and Community Care
NDI	National Death Index
NMDS	National Minimum Data Set
NRCP	National Respite for Carers Program
pc	4 digit postcode
pc2	first two digits of 4 digit postcode
PIAC	Pathways in Aged Care
RAC	residential aged care
RCCP	residential care and community care packages (includes RAC, EACH, EACHD and CACP)
s	sex
s3	the 2nd, 3rd and 5th letters of the family name substituting '2' for short names
st	state
ur	usual residence
v1	version 1
v2	version 2
VHC	Veterans' Home Care
yob	year of birth

Symbols used in tables

–	nil or rounded to zero
. .	not applicable
N	number
n.e.c.	not elsewhere classified
n.e.s.	not elsewhere specified
n.p.	not published

Executive summary

Coordination of aged care services is important, both to provide services cost-effectively and to provide the appropriate care for people at the appropriate time. Using linked data from the Pathways in Aged Care (PIAC) cohort study, this report presents groundbreaking large-scale analysis of people's use of aged care services. This analysis includes information on time to key events, changes in use of care programs over time and concurrent use of programs.

The PIAC cohort comprises 105,000 people who had a completed assessment by an Aged Care Assessment Team (ACAT) under the Aged Care Assessment Program (ACAP) in 2003–04. Their ACAP assessment data were linked to data for five key aged care programs: Home and Community Care (HACC), Veterans' Home Care (VHC), Community Aged Care Packages (CACPs), Extended Aged Care at Home packages (EACH) including EACH (Dementia), and residential aged care (RAC). Program use was identified for 2003–06.

For analytical purposes, the PIAC cohort was divided into groups based on use of aged care programs before the first completed assessment in 2003–04:

- *Continuing path cohort*: clients who had used ACAT-dependent services (27,640 people)
- *HACC and/or VHC before cohort*: clients who had used only HACC or VHC services (42,974)
- *No previous care cohort*: clients who had not previously used aged care services (34,463).

Main findings

- People do not need an ACAT assessment to access HACC or VHC. However, for many people their first contact with the aged care system is through an ACAT: just over 40% of the cohort with no previous use of aged care programs accessed HACC or VHC following their ACAT assessment (Figure 3.2).
- Although approval for program use from an ACAT assessment is valid for 12 months, re-assessment within that period is common: 30% of the no previous care cohort had a re-assessment within 12 months, and two-fifths of these had no intervening program use (Table 2.3).
- Before 1 July 2009, approval to use residential respite care had to be renewed annually to maintain access. This requirement was an important cause of re-assessment (Table 2.6).
- Assessments do not necessarily result in program use: 25% of the no previous care cohort did not newly access any care programs within 2 years. Nearly one-quarter of these people had died (Table 3.3).
- The use of care programs by the cohort increased over time (Figure 4.3). In particular, among no previous care cohort members the proportion who were in permanent RAC more than doubled between 3 months and 24 months after their first assessment in 2003–04—from 17% of clients still living to 34% (Table 4.7).
- Some care programs can be accessed simultaneously. For the no previous care cohort, 6 months after assessment:
  - One in six CACP recipients (16%) were also using services from other programs.

  - Almost 40% of people who were clients of VHC were also accessing services from the large HACC program.
  - Just under 10% of those using HACC were also accessing other programs.
  - Two-fifths of the people in respite RAC were also using a community care program when they were at home.
- Nearly one-third of the PIAC cohort died within the 2-year study period (Table 4.8).

Overview

Background

Since the early 1980s the Australian Government has implemented a range of reforms that have increasingly placed emphasis on formal assessment processes. These reforms have also expanded the focus of care provision from residential aged care (RAC) to include a wide range of community care services. While there has been a proliferation of programs, between 2001–02 and 2005–06 four key programs accounted for around 85% of government expenditure on programs delivering community aged care (excluding assessment services): Home and Community Care (HACC), Veterans' Home Care (VHC), Community Aged Care Packages (CACPs) and EACH packages (Extended Aged Care at Home), including EACHD (EACH Dementia).

Coordination of aged care services is important both to provide services cost-effectively and to provide the appropriate care for people at the appropriate time. Until recently there has been no capacity to describe statistically the way in which the aged care system functions as a whole. However, with the implementation of client-level National Minimum Data Set (NMDS) for HACC in 2001–02 and ACAP (NMDS version 2) in 2003–04, unit-record data were available nationally for most of the main national aged care programs. Even so, the data collections for the different programs were, and are, held on different databases so that analyses were still generally program-specific.

The PIAC cohort study

In 2006 a consortium of researchers at the Australian Institute of Health and Welfare (AIHW), University of Queensland and La Trobe University was successful in obtaining a National Health and Medical Research Council (NHMRC) grant to undertake analysis of care pathways in the aged care sector. The Pathways in Aged Care (or PIAC) project is a cohort study designed to explore the care transitions and care pathways for older Australians.

The PIAC cohort study linked data for key national aged care services for a cohort of 105,000 people. The cohort comprises people who had a completed assessment by an Aged Care Assessment Team (ACAT) under the Aged Care Assessment Program (ACAP) in 2003–04 which was recorded on version 2 of the ACAP National Minimum Data Set. ACAP data for the cohort were linked to data sets which showed use of five main aged care programs between 2003–04 and 2006–07: HACC, VHC, CACP, the two related programs of EACH and EACHD, and residential aged care (RAC). Program use data for 2002–03 were also matched to allow identification of people with previous program use, and deaths among the cohort were also identified.

The PIAC cohort

For analytical purposes, the PIAC cohort is divided into groups based on their program use before the first completed ACAT assessment in 2003–04:

- *Continuing path cohort*: clients identified as having previously used ACAT-dependent services (CACP, EACH, EACHD, RAC) (27,640 people)

- *HACC and/or VHC before cohort*: clients identified as having previously used only HACC or VHC services. This group consists of three subsets:
  - HACC only before (37,546 people)
  - VHC only before (2,471 people)
  - HACC and VHC before (2,957)
- *No previous care cohort*: clients identified as not having previously used HACC, VHC or ACAT-dependent care programs (34,463).

The subset of the cohort that had not used ACAT-dependent programs before their first completed assessment of 2003–04 (i.e. the 'HACC and/or VHC before' and 'No previous care' groups) constitute the PIAC *new-pathways cohort*. To simplify the discussion, the first completed ACAT assessment recorded for a cohort member in 2003–04 on ACAP NMDS v2 is referred to as the *reference assessment*.

Analysis of the characteristics of the PIAC cohort groups suggests that people in the new-pathways cohort who had already accessed HACC or VHC before their reference assessment had higher care needs than those who had had no previous care, and so were further along their 'care needs pathway'. As expected, those in the continuing pathway group had the highest care needs.

In summary:

- The average age of the PIAC cohort was 81 years and 4 months; 15% of the cohort were aged 90 or over at the reference assessment.
- Just 36% of the PIAC cohort were men. This varied with PIAC group: 31% of the continuing path cohort were men, compared with 34% of those with HACC or VHC only before the reference assessment, and 41% of those with no previous care.
- New-pathways cohort members who had used VHC had a different demographic profile from other cohort members as a consequence of the eligibility criteria for this program.
- Across the PIAC groups, between 20% and 23% of the cohort had their ACAT reference assessment in hospital.
- Almost 40% of the continuing path cohort were reported as already living in permanent residential care.
- Among cohort members living in the community at the reference assessment, nearly 80% had a carer available. Carers were most commonly a spouse (35% of carers) or daughter (also 35%).
- On average between three and four health conditions were reported as contributing to the care needs of cohort members. The level of co-morbidity was least among cohort members who had not previously used care programs.
- The most common health conditions affecting care needs were circulatory system diseases (60% of the cohort), mental disorders (40%, including 27% with dementia), musculoskeletal diseases (42%), and endocrine, nutritional and metabolic disorders (21%). The first three of these were also commonly identified by ACATs as the main health condition impacting on need for assistance.
- Among people recommended to live in the community, 48% did not receive an ACAT approval to use any of the ACAT-dependent programs at their reference assessment. However, nearly two-thirds of those without any approvals got recommendations for community care programs.

Re-assessment

An ACAT approval for a particular program cannot be given without the consent of the client. During the period covered by the study (2003–2006), approvals for all programs remained valid for 12 months. Re-assessment within the 12 month period may have occurred for a number of reasons, including changes in client circumstances and maintaining access to programs.

Nearly one-third (31%) of the PIAC cohort had a re-assessment within 12 months of their first completed ACAT assessment in 2003–04. These people averaged 1.25 re-assessments. Examination of assessment patterns revealed the following:

- New-pathways members who had accessed HACC or VHC services before the reference assessment were more likely to have a re-assessment than other cohort members.
- Among people who had a re-assessment within 12 months, the first event in their care pathway after the reference assessment was commonly a further ACAT assessment (46% of the continuing path PIAC group and 49% of the new-pathways cohort). This suggests either a change in circumstances or a change in attitude since their earlier assessment, as clients must agree to a type of care before it can be approved by an ACAT.
- Among the no previous care cohort, the most common event after their assessment was use of HACC or VHC (43% compared with less than 15% for other PIAC groups). This indicates that many people were being directed towards these community care services by the ACATs, even though these programs could be accessed without an ACAT assessment.
- Analysis suggests that, during the study period, people were having re-assessments in order to retain access to residential respite care.

Changes in repeat approval requirements for residential respite care and high-level residential and packaged care from 1 July 2009 will reduce the number of re-assessments in the future.

Care pathways

People access services to suit their particular circumstances, and so patterns of service use are diverse in terms of the programs accessed and the frequency and order in which they are used. Among the full PIAC cohort, the linked data commonly identified over five program access events for a client, with a small number having over 25 distinct periods of program use over the study period. The occurrence of large numbers of events combined with the variety of care programs available means that there are many thousands of different care pathways.

Examination of care pathways is simplified if a clear starting point can be identified. To achieve this, the analysis was restricted to the new-pathways cohort.

Different approaches can be used to examine pathways. For example, looking at the order in which people access care programs but without considering the timing or re-assessments, the 77, 400 people in the PIAC new-pathways cohort had 1,003 distinct care pathways over 2 years, including those ending in death.

While there were many different care pathways, a relatively small set was used by a large proportion of the cohort. Looking at the first three care changes after the reference ACAT assessment, for new-pathways cohort members:

- 14 path combinations were used by 82% of people.
- The most common path was the 'no change' path: 16% of the cohort were still alive 2 years after the reference assessment and had not newly accessed any care programs in that time. However, almost half of these people were, or had already been, HACC or VHC clients.
- 8% of the cohort died before taking up any new program services; two-thirds of these people had been HACC or VHC clients prior to their ACAT assessment.
- 22% of the cohort only accessed permanent residential care after their reference assessment, with just over 40% of these dying within the 2-year study period.
- 14% only accessed HACC or VHC services within 2 years of their reference assessment.

Analysis again shows that people were being pointed towards non-ACAT-dependent community care services by ACATs: five of the top 14 care pathways began with accessing, or re-accessing, HACC or VHC services. These five paths were used by over one-quarter (29%) of the new-pathways cohort with no previous care.

Changes over time

Linking program data which includes information on dates of program use allows us to look at time to key events, changes in use of care programs over time and at concurrent use of programs. Among the new-pathways cohort:

- Nearly 13% had accessed a CACP within 1 year of their reference ACAT assessment, and 43% had been admitted to permanent residential aged care.
- The first 3 months after the reference assessment saw the largest take-up rates for both packaged and residential care.
- Take-up rates were higher among those who had previously used HACC and VHC, as were death rates. These results support the hypothesis that new-pathways cohort members with no previous care were not as advanced along their care needs pathways as other members.

As expected, the service use profile of the cohort groups changed over time:

- In all PIAC groups, the proportions of living cohort members in permanent RAC increased over time. The increase in use of permanent RAC was accompanied by relative decreases in the use of respite RAC, and, more noticeably, HACC.
- At the time of their first completed assessment in 2003–04, 41% of the continuing path group were in permanent RAC, 28% were on a care package and 15% were using HACC or VHC only. Within 2 years, 39% of these people had died, and of those still alive, 70% were in permanent residential care and 14% were package recipients. A further 7% were using HACC and/or VHC services.
- People who had not used aged care services before their reference assessment were less likely than others to take up these services within the study period. In the 2-year period after the ACAT assessment, just over a quarter of the no previous care group died. Just over one-third (34%) of those still alive after 2 years were in permanent residential care, 8% were in receipt of a community care package and 15% were HACC or VHC clients only.
- Concurrent use of HACC services was common among community care package recipients and VHC clients.

- Because of its short term nature, at any one time few people were in residential respite care (always under 3%). However, for all cohort groups and at all time periods considered, more than half of those in respite RAC were accessing at least one community care program when they were at home.
- Two-fifths (39%) of the continuing path group died within 2 years of their reference ACAT assessment, as did 32% of the new-pathways cohort who had used HACC or VHC before and 27% of those who had not previously used care programs.

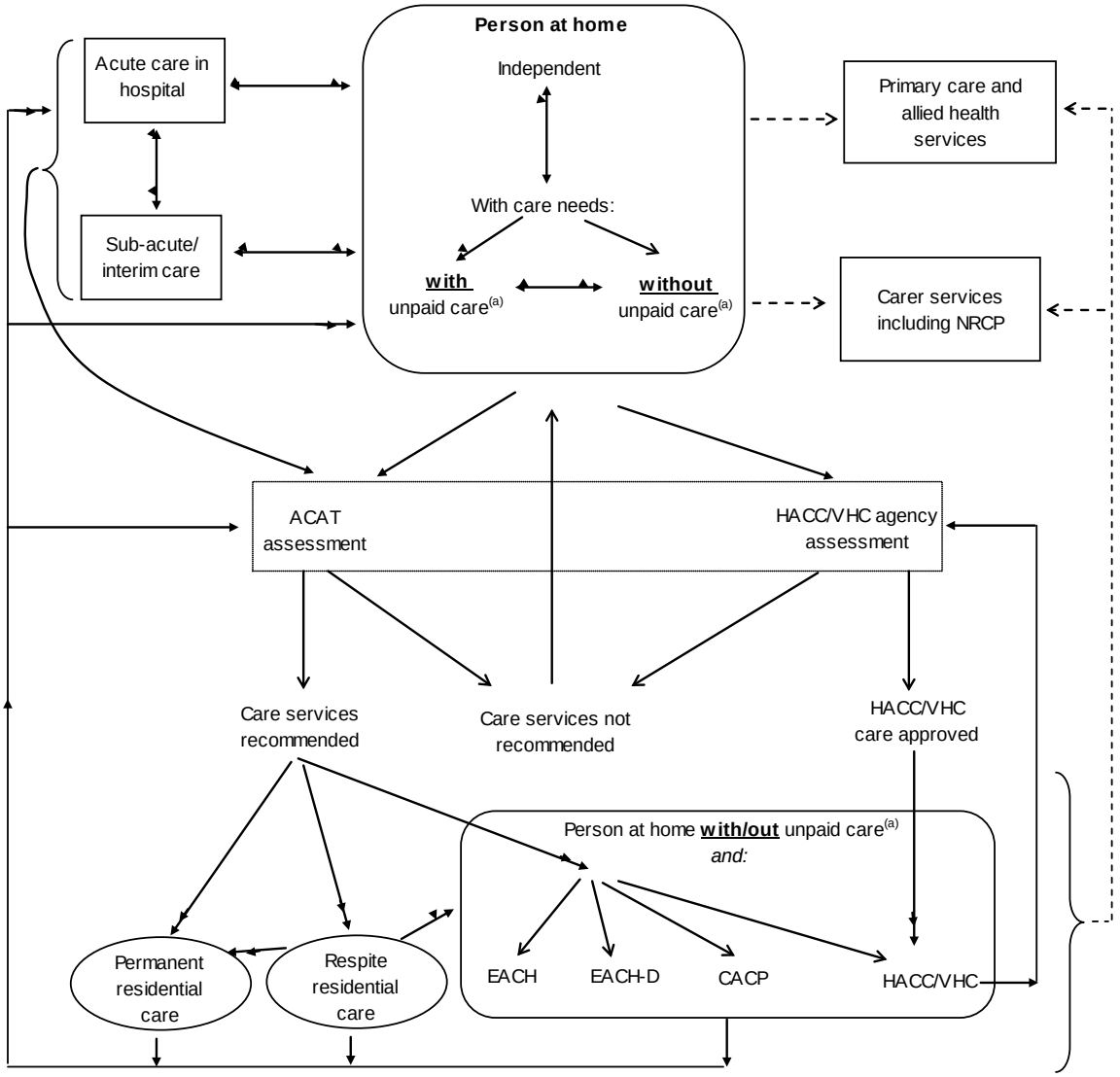
1 Introduction

1.1 Background

By the early 1980s there was 'a general recognition in the aged care field that Australia had an overly large and expensive long-term institutional-care sector, and a correspondingly under-developed home-based sector' (AIHW 2001). To address this imbalance, there has been a range of reforms that have increasingly placed emphasis on formal assessment processes and expanded the focus of care provision from residential care to providing a continuum of care, with community care being developed to both supplement and complement residential care (AIHW 2001; AIHW 2007a). This evolution reflected the wishes of older people, with assessment teams 'finding that not only did many frail older people not need nursing home or hostel [residential] care, they did not want it either' (Bruen 2005).

In response to expressed preferences, the Australian Government developed—and continues to expand—a range of community care and information programs (see Figure 1.1 for key programs in care provision). By 2004 the Australian Government was funding 17 community care programs, with program initiatives still continuing (DoHA 2004, AIHW 2007a). While there has been a proliferation of programs, between 2001–02 and 2005–06 four key programs accounted for around 85% of government expenditure on programs delivering community aged care (excluding assessment services): Home and Community Care (HACC), Veterans' Home Care (VHC), Community Aged Care Packages (CACPs) and EACH packages (Extended Aged Care at Home), including EACH (Dementia) (EACHD) (AIHW 2007a).

The aged care sector within Australia is very complex, with a wide range of services available to older people in need of assistance. Moreover, different programs have different access processes: an approval through the Aged Care Assessment Program (ACAP) is required before a person can access residential aged care (RAC) or the aged care package programs (CACP, EACH and EACHD), but program-specific assessment processes regulate access to other community care programs like HACC and VHC (Figure 1.1). Therefore, coordination of aged care services is important both to provide services cost-effectively and to provide the appropriate care for people at the appropriate time. However, until recently there has been no capacity to describe statistically the way in which the aged care system functions as a whole (Gray 2001). Computerised person-level administrative data have been maintained for residential aged care (RAC) and CACPs since the 1990s, and administrative data have been collected for each of VHC, EACH, EACHD and the Transition Care Program (TCP) as they became operational. In addition, the client-level HACC National Minimum Data Set (NMDS) was implemented in 2001. For ACAP, from 1994 there was a nationally-agreed minimum data set with jurisdictional data sets maintained by each state and territory. However, it wasn't until the ACAP National Data Repository (NDR) was established late in 2003 to collect the client-level ACAP NMDS (version 2) that unit-record data became available nationally. Consequently, with the implementation of client-level NMDSs for HACC in 2001–02 and ACAP in 2003–04 data became available for most of the main national aged care programs. Even so, the data collections for the different programs were, and are, held on different databases so that analyses were still generally program-specific (ACAP NDR 2006; AIHW 2006a, 2006c; DoHA 2005).



(a) Excluding payments from government pensions and benefits.

Note: Figure includes selected government-funded programs only, for 2003–04.

Source: Adapted from Runge et al. 2009:10.

Figure 1.1: Possible movements through the Australian health and aged care system (2003–04)

Given that there are national data sets which separately contain data on individuals' use of various care programs, integrating the data from these sources would provide a valuable resource for examining people's use of different programs and relationships between programs. Statistical data linkage is a powerful tool for achieving such integration to extend the utility of data sets beyond their individual boundaries (Brook et al. 2005). In addition, there is an emerging recognition that statistical data linkage between existing data sets greatly facilitates investigations into many issues for which it is very difficult and/or expensive to obtain purpose-specific data (AIHW: Community Services Ministers' Advisory Council 2004). This is particularly true when examining movements between services for which considerable data are collected as part of program administration.

Although some analyses of trajectories of care and cross-program use have been undertaken in the past (see AIHW 2001; AIHW: Karmel 2005b, 2006; AIHW: Karmel & Braun 2004), before the establishment of the ACAP NMDS version 2 (v2) in 2003 it was not possible to obtain longitudinal data to examine care pathways for clients of aged care programs from assessment without instituting expensive purpose-specific longitudinal surveys. The advent of the ACAP NMDS v2 means that, using statistical data linkage to link the assessment, community care and residential care data sets, it is now feasible to derive a database that is suitable for analysis of care transitions and pathways, from the point of assessment by ACATs through the community care and residential care sectors.

1.2 The PIAC study

In 2006 a consortium of researchers at the Australian Institute of Health and Welfare (AIHW), University of Queensland and La Trobe University was successful in obtaining a National Health and Medical Research Council (NHMRC) grant to undertake analysis of care pathways in the aged care sector. The Pathways in Aged Care (or PIAC) project is a cohort study designed to explore the care transitions and care pathways for older Australians.

The PIAC project used statistical data linkage to create a national database linking data from the ACAP aged care assessment process to data on actual service use patterns of RAC, community care packages, HACC and VHC. This linked data allows investigation into movement between programs within the aged care system.

1.3 Overview of data

Scope and data sources

The PIAC study is based on a cohort approach. The cohort of interest is the 105,000 people who had a completed assessment by an Aged Care Assessment Team (ACAT) in 2003–04 that is recorded on ACAP NMDS v2. Using record linkage, the care pathways of these people are identified in terms of their use of aged care services between 2003–04 and 2005–06. This allows analysis of pathways for at least 2 years after an assessment in 2003–04. Service use in 2002–03 is also included to identify people with previous program use.

The data used in this project cover six aged care programs (including assessment), as well as deaths. The latter is important for distinguishing between cohort members who didn't get

any assistance and those who died before getting assistance. The programs included in PIAC are ACAP, RAC, CACP, EACH, EACHD, HACC and VHC (described in Box 1.1)

Box 1.1: Aged care programs in the PIAC project

- **Aged Care Assessment Program** (ACAP), under which multi-disciplinary Aged Care Assessment Teams (ACATs) determine people's care needs and make recommendations concerning the preferred long-term living arrangement. Relevant approvals are required from an ACAT in order to access RAC, CACP and EACH(D) programs. During the study period approvals were valid for 12 months.
- **Residential aged care** (RAC), which provides both permanent and short-term respite care in residential aged care facilities. An ACAT approval is required to access funded places.
- **Community Aged Care Packages** (CACPs) program, which provides support services for older people with complex needs living at home who would otherwise be eligible for admission to 'low-level' residential care. CACPs provide a range of home-based services, (but excluding home nursing assistance and allied health services), with care being coordinated by the package provider. An ACAT approval is required for access.
- **Extended Aged Care at Home** (EACH) program (operational from 2002), which provides care at home that is equivalent to high-level residential care. An EACH place is commonly called a package, and an ACAT approval is required.
- The associated program **Extended Aged Care at Home (Dementia)** (EACHD) program (operational from 2006) provides a community care option specifically targeted to high care clients with dementia and behavioural and psychological symptoms (ACAT approval also required).
- **Home and Community Care** (HACC), which provides a large range of services (including allied health and home nursing services) to support people at home and to prevent premature or inappropriate admission to residential care. An ACAT approval is not required to access HACC services.
- **Veterans' Home Care** (VHC), which provides a limited range of services to help veterans, war widows and widowers with low-level care needs to remain living in their own homes longer. As for HACC, an ACAT approval is not required. Eligible veterans who need higher amounts of personal care than provided under VHC may be referred to the Community Nursing program (Gold or White Repatriation Health Card holders only).

Source: AIHW 2007a.

The data come from two main sources: program-specific NMDSs and administrative program data (Table 1.1). Note that age restrictions (e.g. 65+) were not applied to the data sets for this study to allow identification of early use of aged care programs.

While the program data sets are designed to have universal coverage, take-up of the ACAP NMDS v2 was not completed until October 2005 (see Appendix B). For 2003–04, all assessments in Queensland and 40% of those in New South Wales were not reported to the ACAP NDR using version 2 of the NMDS. Queensland was also not included the following year. Consequently, the cohort under study is not truly national. Nevertheless, 70% of assessments in 2003–04 were reported on ACAP NMDS v2 and, since the study is based on a cohort identified by their inclusion on the 2003–04 ACAP NMDS v2, this incompleteness of the data set should not affect the utility of the linked data as, beyond reducing the size of the

cohort under study, there is no apparent reason why it should effect the analyses undertaken in this report. In particular, while there are some differences in the way assessment teams operate across the states and territories, the ACATs in Queensland and New South Wales do not appear to have major operational differences compared with those in other parts of the country that would suggest particular biases in the data for the PIAC cohort (ACAP NDR 2005).

Table 1.1: Programs and data included in the PIAC study

Program/event	Years included in study	Data	Size of program (clients aged 65+)	Data source
ACAP	2003–04 and 2004–05	• demographics • dependency level • health conditions • carer availability • assessment dates and team	121,533 in 2004–05[(a)]	ACAP NMDS v2[(a)]
RAC	2002–03 to 2005–06	• demographics • care needs • dates of episodes of care	145,175 permanent residents as at 30 June 2006 33,801 in respite care in 2005–06	SPARC database within ACCMIS[(b)]
EACH and EACHD	2002–03 to 2005–06	• demographics • dates of episodes of care	1,984 as at 30 June 2006	SPARC database within ACCMIS
CACP	2002–03 to 2005–06	• demographics • dates of episodes of care	29,972 as at 30 June 2006	MERLIN database within ACCMIS
HACC	2002–03 to 2005–06	• demographics • quarterly use of service types	561,789 in 2004–05	HACC NMDS v1 and v2 (from January 2006)
VHC	2002–03 to 2005–06	• demographics • use of service types • dates of service provision	70,997 in 2005–06	VHC management information system[(c)]
Deaths	1 July 2003– 31 December 2006	• demographics • date of death • cause of death	103,486 in 2005	NDI

(a) For 2003–04 and 2004–05 Queensland and some parts of New South Wales did not report in ACAP NMDS v2. For these years it is estimated that ACAP NMDS v2 covered 70.1% and 85.2% of ACAT assessments, respectively. (ACAP NDR 2005, 2006).

(b) ACCMIS = Aged and Community Care Management Information System, held by the DoHA. The PIAC study uses the ACCMIS 2006 refresh—a snapshot of the database from October 2006.

(c) Maintained by the Australian Department of Veterans' Affairs

Source: Program use from AIHW 2007a; deaths from AIHW 2007b.

A second constraint comes through the coverage of the HACC NMDS. While all HACC providers are required to submit data for the NMDS, in practice not all do, and between 2002–03 and 2005–06, 82–83% of HACC agencies provided data to the NMDS (DoHA 2005, 2006b, 2007). In addition, the service use information on the HACC NMDS is reported only by quarter. These data issues result in some under-identification of the use of HACC services by the cohort and in imprecision in the timing of reported service use relative to use of other programs (see Appendix B).

Data linkage

As the information recorded for an individual may change from data set to data set—due to either differences in reporting (e.g. in first name) or errors—a robust linkage process should allow for some discrepancy in reported characteristics. Probabilistic matching allows for such variation by deriving a measure of similarity across match variables, called the match weight. This is then used to decide whether a particular pair-wise comparison between records on two data sets is accepted (high weight) or rejected (low weight) as a match, or link. Clerical review of possible record matches is generally used to decide both the total weight above which comparison pairs are acceptable as a match and to determine whether matches with weights near this cut-off should be considered to be valid matches. Such review commonly involves manual inspection of full name and/or address data for the potential matched pair (Jaro 1995; Herzog et al. 2007).

Full-name data is available on only a subset of the data sets included in the PIAC study, but all either explicitly contain or have sufficient information to derive the SLK-581 statistical linkage key (SLK) where the SLK-581 for a person is the concatenation of five letters of name, date of birth (represented as eight digits) and sex (AIHW: Karmel 2005b). Previous analysis has shown that SLK-581 distinguishes well between individuals in aged care data sets (AIHW: Karmel 2005a, 2005b, 2006; AIHW: Karmel & Braun 2004). Consequently, the linkage strategy is based on matching records primarily via SLK-581. In addition, for many data set pairs there are other common data items, and these are also employed in the linkage.

While, theoretically, probabilistic matching could be applied to the components of SLK-581 and other variables available for matching, it was not used in this study because of difficulties in setting weight cut-offs to determine acceptable and unacceptable matches in the absence of information suitable for clerical review (in particular, full name and/or address). Instead, successive matches were made using different linkage keys, each key being defined in terms of components of SLK-581 and any available additional linkage data. Incorporating non-SLK-581 information into the linkage strategy allowed further variation to be considered when matching, and so facilitated linking records for people who had slightly different personal information recorded in the different data sets. Also, in the small number of cases where different people have the same SLK-581, additional match variables aids correct matching.

Initial keys to be considered for matching were identified by considering all possible keys based on components of the SLK-581, region, and additional common data (for particular data set pairs). Three measures of likely link quality were developed to decide whether a particular key combination should be used for matching and to determine the order in which keys should be used (see Appendix C; also Karmel et al. 2010). Results from the linkage process are presented in Table 1.2. Before data linkage was undertaken, ethics approval and permission to use the required data were obtained from all relevant bodies. In addition, to

protect the privacy of individuals the linkage was carried out within the AIHW using the Institute's data linkage protocol (AIHW 2006b).

Analysis of the linked data shows that the stepwise linkage process resulted in high quality links, with few false positives (Table C.8). For example, although 43% of the PIAC cohort linked to a death record, under 1% of care paths for PIAC cohort members included a link which implied services had been accessed after death (Table C.8).

Table 1.2: Summary of links to the PIAC cohort

Data set	Clients	Links	Per cent of cohort	Per cent of data set
ACAT-dependent aged care				
RAC/EACH(D)	373,183	68,742	65.4	18.4
CACP	80,028	20,879	19.9	26.1
All	*415,057*	*76,289*	*72.6*	*18.4*
Other aged care				
HACC 02–03	615,642	48,604	46.3	7.9
HACC 03–04	675,446	61,447	58.5	9.1
HACC 04–05	710,781	41,483	39.5	5.8
HACC 05–06	705,261	27,500	26.2	3.9
All HACC		*75,357*	*71.7*	. .
VHC	164,192	12,827	12.2	7.8
Other				
ACAP 2004–05	141,911	32,443	30.9	22.9
NDI	470,121	44,930	42.8	9.6
Any link	. .	*100,398*	*95.5*	. .
Total cohort (ACAP 2003–04)	**105,077**	**. .**	**. .**	**. .**

Note: Cohort members may use more than one program, or the same program in more than 1 year, and so percentages of cohort do not sum to 100.

PIAC groups

To facilitate analysis, the PIAC cohort has been divided into five groups, depending on whether they had used care services prior to their first completed ACAT assessment in 2003–04, and, if they had, the type of services they had used. These groups are described in Box 1.2 and illustrated in Figure 1.2. In addition, to simplify discussion the first completed ACAT assessment recorded for a cohort member in 2003–04 on ACAP NMDS v2 is referred to as the *reference assessment* (Box 1.2). A detailed description of the PIAC groups at the time of their reference assessment, and the related assessment outcomes, is given in Appendix A. A summary is provided below.

Box 1.2: Definition of PIAC groups

The PIAC cohort is divided into five groups for analytical purposes:

1. *Continuing path*: clients identified through data linkage as having used ACAT-dependent services (CACP, EACH(D), RAC) before their first completed assessment of 2003–04
2. *HACC only before*: clients identified through data linkage as having only used HACC services before their first completed assessment of 2003–04
3. *VHC only before*: clients identified through data linkage as having only used VHC services before their first completed assessment of 2003–04
4. *HACC and VHC before*: clients identified through data linkage as having only used HACC and VHC services before their first completed assessment of 2003–04
5. *No previous care*: clients identified through data linkage as having used neither HACC or VHC services nor ACAT-dependent care programs before their first completed assessment of 2003–04.

Together, groups 2 to 5 constitute the PIAC new-pathways cohort; that is, this subset of the PIAC cohort had not used ACAT-dependent programs before their first completed assessment of 2003–04 (Figure 1.2). Groups 2 to 4 are often combined for analyses, and in tables are referred to as *HACC/VHC before*.

To simplify discussion, the first completed ACAT assessment recorded for 2003–04 on ACAP NMDS v2 is referred to as the reference assessment. Clients in group 1 above would necessarily have had an earlier ACAT assessment to access ACAT-dependent services. In addition, it is estimated that 15%–20% of the 2003–04 new-pathways cohort had an earlier assessment in 2002–03 (based on 2003–04 and 2004–05 ACAT assessment patterns).

Summary of characteristics

Analysis of the PIAC cohort groups suggests that people in the new-pathways cohort who had already accessed HACC or VHC before their reference assessment had higher care needs than those who had had no previous care, and so were further along their 'care needs pathway'. As expected, those in the continuing pathway group had the highest care needs.

The PIAC cohort has the following characteristics:

- The average age of the PIAC cohort was 81.4 years; 15% of the cohort were aged 90 or over at the time of the reference assessment. Continuing path group members were, on average, older (83.3 years) than others. Those with no previous care had an average age of 79.5 years.
- Just 36% of the PIAC cohort were men, but this varied with the PIAC group: 31% of the continuing path cohort were men, compared with 34% of those with HACC or VHC only before the reference assessment, and 41% of those with no previous care.
- New-pathways cohort members who had used VHC had a different demographic profile from other cohort members as a consequence of the eligibility criteria for this program. They were more likely to be male (over 50% versus 36% for the full PIAC cohort), to be aged 80–89 years (70% versus 49%) and to be born in Australia (94% versus 68%), and less likely to be Aboriginal or a Torres Strait Islander (0.1% versus 1.0%).

- Almost 40% of the continuing path cohort were reported as already living in permanent residential care. In all PIAC groups, small proportions of ACAP clients were living in other institutions and supported accommodation.

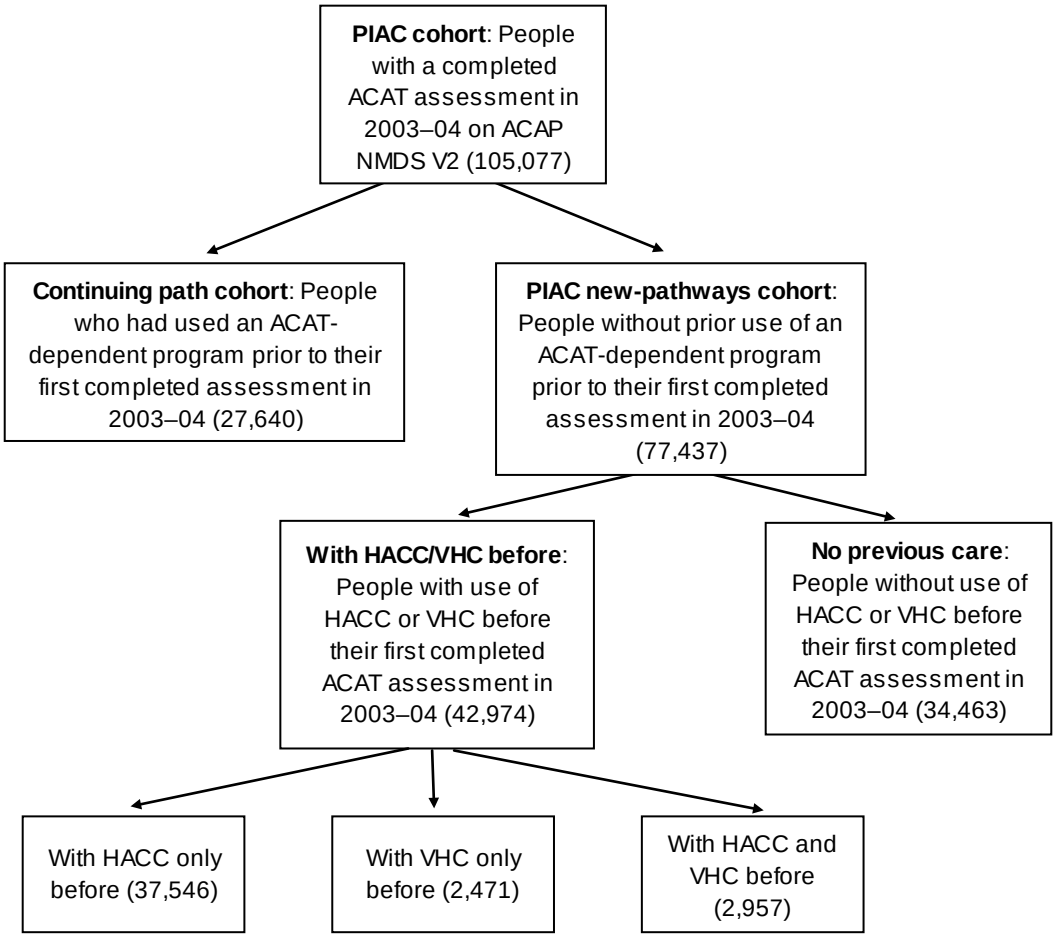


Figure 1.2: PIAC groups

- Among cohort members living in the community at the reference assessment, over two-fifths lived alone. However, nearly 80% of those who reported carer status had a carer available. Carers were most commonly a spouse (35% of carers) or daughter (also 35%).
- Over two-fifths (43%) of cohort members needed assistance with three or more activities of daily living (out of a possible five). Such care needs were lowest among those with no previous care (average of 1.9 needs) and highest among those in the continuing path group (average of 3.0).
- Across the PIAC groups, between 20% and 23% of the cohort had their ACAT reference assessment in hospital.
- On average between three and four health conditions were reported as contributing to the care needs of cohort members. The level of co-morbidity was least among cohort members who had not previously used aged care programs (average of 3.4 health conditions) and highest among those in the continuing path group (average of 4.0).

- The most common health conditions affecting care needs were circulatory system diseases (60% of the cohort), mental disorders (40%, including 27% with dementia), musculoskeletal diseases (42%), and endocrine, nutritional and metabolic disorders (21%). The first three of these were also commonly identified by ACATs as the main health condition impacting on need for assistance (for 22%, 24% and 13% of the cohort, respectively).
- Among people recommended to live in the community, just over one-half got an ACAT approval to use an ACAT-dependent program at their reference assessment. Nearly two-thirds of the remainder got recommendations for community care programs.
- Nearly 60% of the PIAC cohort received approval for at least one care program that required an ACAT assessment. Those with no previous use of care programs were the least likely to get one or more approvals (52%), and people continuing on their care pathway were most likely (64%), including 26% with an approval for high-level permanent residential care.
- Among new-pathways cohort members, 20% of those with no previous care were recommended to live in permanent residential care, compared with 25% of those who had used HACC or VHC before.

1.4 This report

The purpose of this report is to provide a broad description of care pathways of the PIAC groups. Aspects of the care pathways analysed include:

- re-assessments by ACATs (Chapter 2)
- patterns of service use (Chapter 3)
- time to starting on a community package or entry into permanent residential care (Chapter 4)
- use of services over time and survival times (Chapter 4).

Appendix A describes in detail the PIAC cohort in terms of their circumstances at the time of their reference assessment and their assessment outcomes. Issues concerning the ACAP, HACC and VHC data used in the analyses are discussed in Appendix B, and details of the linkage process are given in Appendix C.

2 Re-assessment

An approval for a particular program cannot be given without the consent of the client. During the period covered by the study (2003–2006), approvals for all programs remained valid for 12 months. Re-assessment within the 12 month period may have occurred for a number of reasons. People who wanted to make sure that they had continuous access to residential respite care would have needed to have a further assessment within the original 12 month approval period. Also, while use of long-term care programs, such as community packages and permanent RAC do not require annual re-assessment to maintain access once taken up, until 30 June 2004 all permanent aged care residents required an ACAT assessment to change from low to high care, and not just those who were changing care facilities as was the case from 1 July 2004 (AIHW 2005). Changes in client attitude and circumstances may also result in a new ACAT assessment within a 12 month period.

In this chapter, re-assessment patterns are examined. For the analysis in this and following chapters, the distinction between HACC and VHC services is dropped. Consequently, the new-pathways group is split into just two groups: those who had used HACC or VHC before their reference assessment and those with no previous care. This was done to simplify the discussion as VHC services are a subset of those provided through HACC, with only a small number of people using only VHC services before their reference assessment (3% of the new-pathways cohort).

2.1 Summary

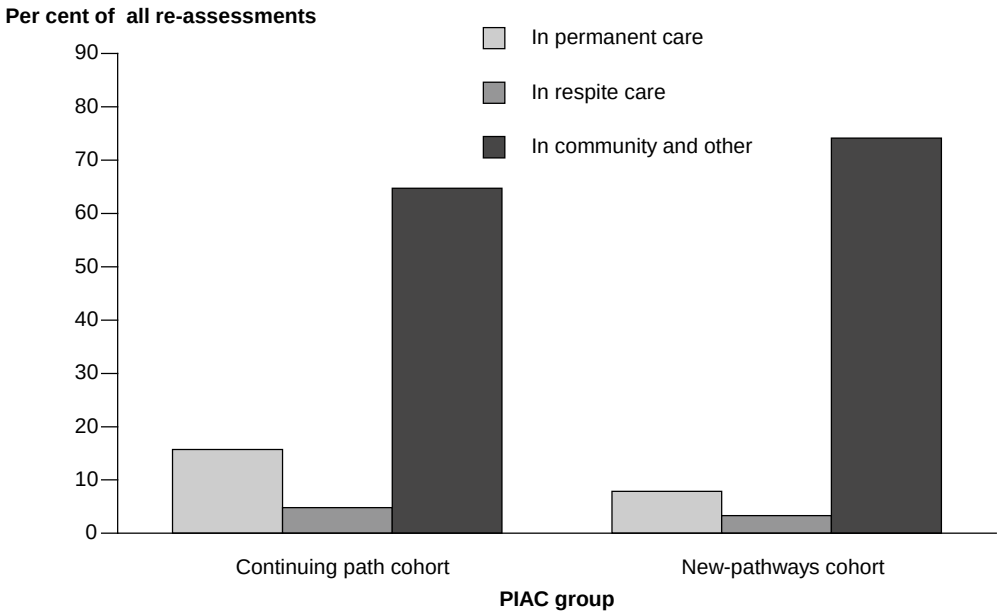
Nearly one-third (31%) of the PIAC cohort had a re-assessment within 12 months of their first completed ACAT assessment in 2003–04. These people averaged 1.25 re-assessments. Re-assessment within the 12 month period may have occurred for a number of reasons. Examination of assessment patterns revealed the following:

- New-pathways members who had accessed HACC or VHC services before the reference assessment were more likely to have a re-assessment than other cohort members.
- Among people who had a re-assessment within 12 months, the re-assessment was commonly the first event in their care pathway after the reference assessment (46% of the continuing path PIAC group and 49% of the new-pathways cohort). This suggests either a change in circumstances or a change in attitude since their earlier assessment, as clients must agree to a type of care before it can be approved by an ACAT.
- For new-pathways people who had not previously used HACC or VHC services the most common event after their assessment was use of these services (43% compared with less than 15% for other PIAC groups). This indicates that many people were being directed towards these community care services by the ACATs, even though these programs could be accessed without an ACAT assessment.
- Analysis suggests that, during the study period, people were having re-assessments in order to retain access to residential respite care.

Changes in repeat approval requirements for residential respite care and high-level residential and packaged care from 1 July 2009 will be expected to reduce the number of re-assessments in the future.

2.2 Re-assessments within 12 months

Nearly one-third (31%) of the PIAC cohort had a re-assessment within 12 months of the end of their first completed ACAT assessment in 2003–04 (Table 2.1).[1,2] New-pathways members who had accessed HACC or VHC services before this assessment were more likely to have a re-assessment than other cohort members (35% compared with less than 30%). Overall, 32,900 cohort members together had 41,000 re-assessments within 1 year of their reference assessment—an average of 1.25 re-assessments (Table 2.2).



Source: Table 2.2

Figure 2.1: Completed re-assessments by location and PIAC group (as per cent of all re-assessments within PIAC group)

An ACAT assessment may end before completion for a number of reasons, including client withdrawal, changes in health status, and death: across all PIAC groups around 15% of the re-assessments ended before completion of the assessment process. In addition, for our cohort 10% of additional assessments were for people already living permanently in residential care at the time of re-assessment. This percentage was higher for those who had accessed ACAT-dependent programs before their reference assessment (17%) than for those who had not (8%). Overall, 70% of re-assessments for people continuing their care pathway and 77% of those for the new-pathways cohort were completed assessments for people living

1 Published data from the ACAP NMDS suggest a re-assessment rate of 18% within the financial year (assuming at most one re-assessment per person) (ACAP NDR 2006:60,191). The higher proportion here results from looking at a full 12 month window, rather than being restricted to re-assessments within a financial year.

2 It is estimated that between 15% and 20% of the 2003–04 new-pathways cohort had an earlier assessment in 2002–03 (based on 2003–04 and 2004–05 ACAT assessment patterns in the linked data).

in the community; for a small percentage of these the ACAP client was in residential respite care at the time (3.6% out of 75.6% for the entire PIAC cohort) (Table 2.2, Figure 2.1).

Among people who had a re-assessment within 12 months, the first event in their care pathway after the reference assessment was commonly a further ACAT assessment (45% of the continuing path PIAC group and 49% of the new-pathways cohort) (Table 2.3). This suggests either a change in circumstances or a change in attitude since their earlier assessment, as clients must agree to a type of care before it can be approved by an ACAT.

For new-pathways people who had not previously used HACC or VHC services the most common event after their assessment was use of these services (43% compared with less than 15% for other PIAC groups) (Table 2.3). This suggests that many people were being directed towards these community care services by the ACATs, even though these programs could be accessed without an ACAT assessment. Further evidence of this is seen in the common care pathways discussed later. This pattern may result from a combination of factors related to knowledge of the service system and eligibility criteria for care packages. For example, potential clients—or those who refer people to aged care services—may not be sure about the various services available or how to access them, and so approach an ACAT. In addition, ACATs must ensure that certain requirements are met before approving use of care packages. In particular:

- the ACAT should only approve use of a package if the client meets the eligibility criteria. To be eligible for a package a person must be eligible to receive residential care at least at the low level of care and have complex care needs that can only be met by a co-ordinated care package of care services (DoHA 2006a).
- the ACAT should take into account the availability of services (AIHW 2002). Limited availability of packages in some areas may therefore have resulted in recommending other community care services to clients (ACAP NDR 2005).

One-third of the continuing path group who had re-assessments accessed residential respite care first after their reference assessment. Only 14% for the new-pathways group had this use pattern, indicating that the high figure most likely reflects the 12 month limit on the currency of an ACAT approval.

From Table 2.3 we see that 13,400 cohort members (13% of the PIAC cohort) had followed their reference assessment with another completed assessment. Furthermore, 14% of these people (1,814, or 2% of the PIAC cohort) then had another completed assessment without accessing any care programs in between (Table 2.4). From the above analysis, in conjunction with that on approvals in Appendix A, we see that it is reasonably common for assessments not to result in any changes in care program use.

Table 2.1: PIAC cohort: number of ACAT re-assessments within 12 months per person by PIAC group (per cent)

ACAT re-assessments within 12 months of reference assessment	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	Total	
Number per person						**Number**
0	72.3	64.7	70.5	67.3	68.6	71,976
1	23.0	28.1	23.9	26.2	25.4	26,631
2	3.8	5.6	4.4	5.1	4.7	4,953
3	0.7	1.1	0.9	1.0	1.0	1,001
4	0.2	0.3	0.2	0.2	0.2	244
5+	0.1	0.1	0.1	0.1	0.1	88
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total clients (number)	**27,545**	**42,920**	**34,428**	**77,348**	**. .**	**104,893**

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference date for additional assessments is the date of the end of the first completed assessment in 2003–04.
3. Components may not add to total due to rounding.

Table 2.2: ACAT re-assessments within 12 months by completion status and place of assessment, by PIAC group

Assessment completion status and location	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	Total	
Completed			**Per cent**			**Number**
In residential aged care	*20.5*	*11.6*	*10.5*	*11.2*	*13.3*	*5,447*
In permanent care	15.7	8.2	7.3	7.9	9.6	3,954
In respite care	4.8	3.4	3.2	3.3	3.6	1,493
Not in residential aged care	64.7	73.2	75.5	74.1	72.0	29,528
Total	*85.3*	*84.9*	*86.0*	*85.3*	*85.3*	*34,975*
Incomplete						
In residential aged care	*3.8*	*2.5*	*1.7*	*2.2*	*2.5*	*1,044*
In permanent care	3.0	1.8	1.4	1.7	2.0	808
In respite care	0.8	0.6	0.3	0.5	0.6	236
Not in residential aged care	10.9	12.7	12.3	12.5	12.2	4,982
Total	*14.7*	*15.1*	*14.0*	*14.7*	*14.7*	*6,026*
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**9,280**	**19,098**	**12,623**	**31,721**	**. .**	**41,001**
Total (row %)	**22.6**	**46.6**	**30.8**	**77.4**	**100.0**	**. .**
Clients (number)	**7,630**	**15,135**	**10,152**	**25,287**	**. .**	**32,917**
Clients (% of cohort group)	**27.7**	**35.3**	**29.5**	**32.7**	**31.4**	**. .**
Average number per person	**1.22**	**1.26**	**1.24**	**1.25**	**. .**	**1.25**

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference date for re-assessments is the date of the end of the first completed ACAT assessment in 2003–04.
3. An ACAT assessment may end before completion due to a number of reasons, personal or medical.
4. Location of assessment is based on use of RAC at start of the assessment, as derived from linked events.
5. Components may not add to total due to rounding.

Table 2.3: PIAC cohort with re-assessments within 12 months: first post-assessment care pathway event by PIAC group

First post-assessment event	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	Total	
			Per cent			Number
Incomplete ACAT assessment	7.0	8.1	5.7	7.1	7.1	2,335
Completed ACAT assessment	37.7	47.1	33.5	41.6	40.7	13,395
HACC	12.1	12.2	40.8	23.7	21.0	6,912
VHC	0.7	1.8	1.9	1.8	1.6	515
CACP	1.9	8.4	4.1	6.7	5.6	1,834
EACH(D)	0.4	0.2	0.1	0.2	0.2	67
Respite RAC	32.7	16.3	9.1	13.4	17.9	5,890
Permanent RAC	7.5	5.9	4.9	5.5	6.0	1,969
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**7,630**	**15,135**	**10,152**	**25,287**	**. .**	**32,917**

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference assessment is the first completed ACAT assessment in 2003–04.
3. An ACAT assessment may end before completion due to a number of reasons—personal or medical.
4. Components may not add to total due to rounding.

Table 2.4: PIAC cohort with re-assessments within 12 months and a completed assessment as the first post-assessment care pathway event: second post-assessment care pathway event by PIAC group

Second post-assessment event	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	Total	
			Per cent			Number
No second event	14.6	12.9	17.5	14.4	14.4	1,935
Incomplete ACAT assessment	3.0	2.5	1.9	2.3	2.4	327
Completed ACAT assessment	11.1	15.6	11.4	14.2	13.5	1,814
HACC	8.1	9.6	18.8	12.6	11.6	1,556
VHC	0.4	1.1	1.8	1.3	1.1	150
CACP	1.6	8.2	5.6	7.3	6.1	818
EACH(D)	1.3	0.7	0.4	0.6	0.8	104
Respite RAC	17.9	17.2	13.1	15.9	16.3	2,183
Permanent RAC	33.2	25.3	24.1	24.9	26.7	3,578
Death	8.8	7.0	5.3	6.4	6.9	930
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**2,873**	**7,126**	**3,396**	**10,522**	**. .**	**13,395**

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference assessment is the first completed ACAT assessment in 2003–04.
3. An ACAT assessment may end before completion due to a number of reasons—personal or medical.
4. Components may not add to total due to rounding.

2.3 Re-assessments and residential respite care

The above analysis suggests that some cohort members were having re-assessments in order to retain access to residential respite care. Examination of care pathways shows that, within 12 months of the completion of their first assessment in 2003–04, 9% of the cohort only accessed respite RAC out of the ACAT-dependent programs. This was highest among those who were continuing their pathway (12%) and lowest among those who had not accessed community care programs prior to the reference assessment (7%) (Table 2.5). Extending the window up to 2 years, 7% of the new-pathways cohort and 10% of the continuing path group accessed respite RAC but neither permanent RAC nor community packages after the reference assessment. Larger proportions used both respite and permanent RAC (15% overall, including nearly 2% of the cohort who also used care packages).

That maintaining access to respite RAC was one of the causes of re-assessment can be further examined by looking at the number of assessments people had by use of respite RAC. Within all PIAC groups, people who only accessed respite RAC out of the ACAT-dependent programs within 2 years of their reference assessment on average had higher numbers of assessments in the first 12 months than those who had not, averaging 1.5 completed assessments compared with 1.3 for the whole cohort (Table 2.6). Furthermore, people accessing respite RAC as well as another program (or programs) tended to have more assessments than those using only the non-respite care: for example, cohort members who used both care packages and respite RAC average 1.7 completed assessments over 2 years compared with 1.3 for those who only accessed CACP or EACH packages.

Those who never accessed ACAT-dependent programs tended to have relatively few assessments (mean of 1.2 completed assessments). This group includes those who died before accessing any programs, which accounts to some extent for the lower number: 8% of the cohort died within 3 months of the reference assessment (see Table 4.8).

Assessment patterns were similar within the various PIAC groups, although those of the 'continuing care' group who had accessed at least one program other than respite RAC after their reference assessment, had a relatively low average number of assessments (1.3 completed assessments compared with over 1.4 for other groups). Entry into permanent RAC explains this difference. Over one-third (36%) of the 'continuing care' group moved into permanent RAC after their reference assessment without using any other ACAT-dependent programs and these people averaged 1.2 completed assessments. Among the new-pathways cohort only 27% similarly went into permanent RAC, and averaged slightly more completed assessments (1.4).

In order to improve the efficiency of the ACAT assessment process and increase access to assessments by older people, changes were implemented from 1 July 2009. From this time approvals for residential respite care, high-level residential care, EACH and EACHD no longer lapse unless specified as time limited by the ACAT.

Table 2.5: PIAC cohort: use of respite RAC after reference assessment, by PIAC group

ACAT-dependent programs accessed after reference assessment	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	Total	
Respite RAC only within 12 months			**Per cent**			**Number**
No	87.8	90.8	93.5	92.0	90.9	95,348
Yes	12.2	9.2	6.5	8.0	9.1	9,545
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**104,893**
Respite RAC only within 2 years						
No	90.5	92.0	93.9	92.8	92.2	96,751
Yes	9.5	8.0	6.1	7.2	7.8	8,142
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total	**27,545**	**42,920**	**34,428**	**77,348**	**. .**	**104,893**
All ACAT-dependent programs accessed after reference assessment within 2 years						
Respite RAC only	9.5	8.0	6.1	7.2	7.8	8,142
Other	*56.2*	*57.2*	*47.5*	*52.9*	*53.8*	*56,393*
Care packages only	1.7	8.6	6.6	7.7	6.1	6,445
Respite RAC and care packages	1.3	2.2	1.4	1.8	1.7	1,779
Permanent RAC only	36.4	27.8	25.7	26.9	29.4	30,807
Respite and permanent RAC	15.2	13.7	10.6	12.3	13.1	13,700
Care packages and permanent RAC	0.5	2.5	1.8	2.2	1.7	1,833
Care packages and respite and permanent RAC	1.0	2.4	1.5	2.0	1.7	1,829
No ACAT-dependent programs	34.3	34.8	46.4	40.0	38.5	40,358
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**27,545**	**42,920**	**34,428**	**77,348**	**. .**	**104,893**

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference assessment is the first completed ACAT assessment in 2003–04.
3. Components may not add to total due to rounding.

Table 2.6: PIAC cohort: mean number of assessments within 12 months of the referenced assessment, by PIAC group

ACAT-dependent programs accessed after reference assessment within 2 years	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	Total
			All assessments within 12 months (mean)		
Respite RAC only	1.59	1.53	1.51	1.53	1.55
Other	*1.40*	*1.54*	*1.50*	*1.52*	*1.49*
Care packages only	1.42	1.40	1.39	1.40	1.40
Respite RAC and care packages	1.69	1.74	1.73	1.73	1.73
Permanent RAC only	1.27	1.44	1.39	1.42	1.37
Respite and permanent RAC	1.63	1.67	1.68	1.67	1.66
Care packages and permanent RAC	1.71	1.85	1.87	1.86	1.85
Care packages and respite and permanent RAC	1.89	1.92	1.97	1.94	1.93
No ACAT-dependent programs	1.17	1.27	1.21	1.24	1.22
Total	**1.34**	**1.44**	**1.37**	**1.41**	**1.39**
			Completed assessments within 12 months (mean)		
Respite RAC only	1.53	1.47	1.45	1.46	1.49
Other	*1.34*	*1.46*	*1.44*	*1.45*	*1.42*
Care packages only	1.35	1.35	1.33	1.34	1.34
Respite RAC and care packages	1.65	1.65	1.64	1.65	1.65
Permanent RAC only	1.22	1.37	1.34	1.36	1.31
Respite and permanent RAC	1.55	1.59	1.61	1.59	1.58
Care packages and permanent RAC	1.60	1.70	1.75	1.72	1.71
Care packages and respite and permanent RAC	1.79	1.80	1.87	1.82	1.82
No ACAT-dependent programs	1.14	1.22	1.17	1.19	1.18
Total	**1.29**	**1.38**	**1.32**	**1.35**	**1.33**

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference assessment is the first completed ACAT assessment in 2003–04. The reference assessment is included in the mean.
3. The use of HACC and VHC services are not considered in this table.

3 Care pathways

People access services to suit their particular circumstances, and so patterns of service use are diverse in terms of the programs accessed and the frequency and order in which they are used. Among the full PIAC cohort, the linked data commonly identified over five program access events for a client, with a small number having over 25 distinct periods of program use over the study period (predominantly regular residential respite care). The occurrence of large numbers of events combined with the variety of care programs available means that there are many thousands of different care pathways.

3.1 Summary

Examination of care pathways is simplified if a clear starting point can be identified. To achieve this, the discussion in this chapter is restricted to the new-pathways cohort.

Different approaches can be used to examine pathways. For example, looking at the order in which people access care programs but without considering the timing or assessments, the 77, 400 people in the PIAC new-pathways cohort had 1,003 distinct care pathways over 2 years, including those ending in death.

While there were many different care pathways, a relatively small set was used by a large proportion of the cohort. Looking at the first three care changes after the reference ACAT assessment:

- 14 path combinations were used by 82% of new-pathways cohort members.
- The most common path was the 'no change' path: 16% of the cohort were still alive 2 years after the reference assessment and had not newly accessed any care programs in that time. However, almost half of these people had already been HACC or VHC clients.
- 8% of the cohort died before taking up any new program services; two-thirds of these people had been HACC or VHC clients prior to their reference assessment.
- 22% of the cohort only accessed permanent residential care after their reference assessment, with just over 40% of these dying within the 2-year study period.
- 14% accessed only HACC or VHC services within 2 years of their reference assessment.

Analysis again shows that people were being pointed towards non-ACAT-dependent community care services by ACATs: five of the top 14 care pathways began with accessing, or re-accessing, HACC or VHC services. These five paths were used by over one-quarter (29%) of the new-pathways cohort with no previous care.

3.2 Diversity of pathways

The great variety in people's use of care programs is illustrated in Table 3.1, with all possible combinations occurring. In particular, around one-quarter of the PIAC cohort did not newly access any care programs within 2 years of the first 2003–04 assessment (26% of the cohort) while just under 1% accessed all of the care programs included in the study.

Identifying a clear starting point simplifies examination of care pathways. With this in mind, the discussion below is restricted to those who had not accessed ACAT-dependent programs

before their first completed assessment in 2003–04, that is to the new-pathways cohort. Note, however, that some of the new-pathways cohort may have had one or more ACAT assessments before July 2003 (see footnote 2), or may have used the HACC or VHC programs.

As illustrated in Figure 3.1, different approaches can be used to examine pathways. For example, looking at the order of program access events and death but without considering the timing, the 77,400 people in the PIAC new-pathways cohort had 9,200 distinct pathways following their reference assessment (Approach A in Figure 3.1 and Table 3.2). If use of HACC or VHC services prior to the reference assessment is also considered, this number increases to 10,743.

The above multiplicity of care pathways makes it difficult to identify common patterns. To overcome this, one approach is to consider the order in which people access, or re-access, care programs. For such an analysis the picture can be simplified by excluding ACAT assessments as these enable access to services rather than provide assistance. Also within-program transfers do not indicate new access or re-access to a care program, and so can be excluded. Taking this approach, cohort members had 2,030 different program-use pathways—including those ending in death—over the 2 years following the end of the reference assessment (Approach B in Figure 3.1 and Table 3.2). This number increases to 2,619 if the use of HACC or VHC services before that assessment is taken into account.

People can access the same care program several times in a row (e.g. have regular periods in residential respite care). Changes in the care programs being accessed over time can be examined by ignoring such repeat use of a program when there has been no intervening use of a different program. Considering only these changes, there were 1,003 distinct care pathways over the 2-year period among the new-pathways cohort (1,358 allowing for use of HACC or VHC services before the reference assessment) (Approach C in Figure 3.1 and Table 3.2).

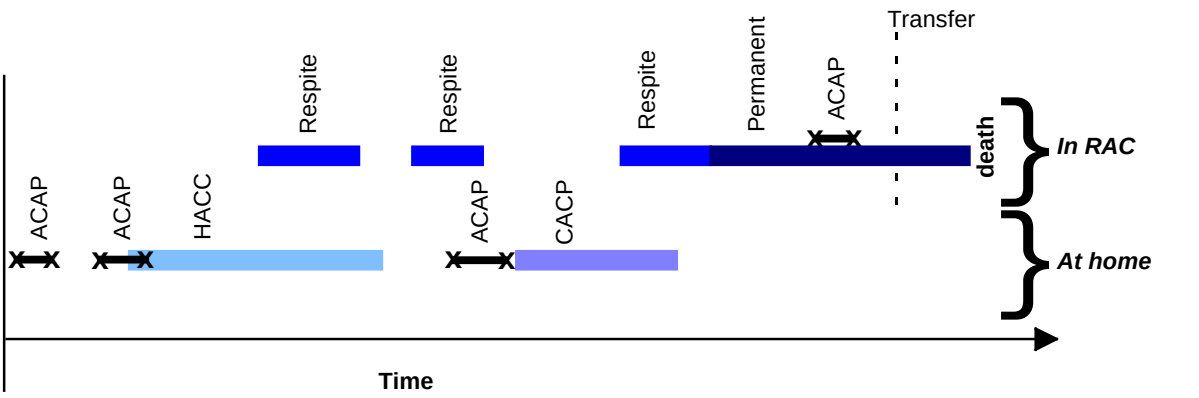


Figure 3.1: Example of a person's aged care pathway, starting from the ACAT reference assessment

Table 3.1: PIAC cohort: aged care programs accessed within 2 years of the reference assessment, by PIAC group

Community care program use starting after reference ACAT assessment	ACAT-dependent program use starting after reference ACAT assessment	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	Total
No HACC/VHC	Respite RAC only	5.8	5.1	2.3	3.9	4.4
	Care packages only	1.0	4.8	2.7	3.9	3.1
	Respite RAC and care packages	0.7	1.2	0.3	0.8	0.8
	Permanent RAC only	33.7	24.3	18.7	21.8	24.9
	Respite and permanent RAC	11.4	10.6	5.4	8.3	9.1
	Care packages and permanent RAC	0.3	1.6	0.7	1.2	1.0
	Care packages and respite and permanent RAC	0.5	1.5	0.6	1.1	0.9
	No ACAT-dependent programs	30.0	23.5	24.6	24.0	25.6
	Subtotal	*83.4*	*72.7*	*55.3*	*65.0*	*69.8*
With HACC/VHC	Respite RAC only	3.6	2.9	3.8	3.3	3.4
	Care packages only	0.7	3.8	3.9	3.8	3.0
	Respite RAC and care packages	0.6	1.0	1.0	1.0	0.9
	Permanent RAC only	2.8	3.5	6.9	5.0	4.4
	Respite and permanent RAC	3.8	3.0	5.2	4.0	3.9
	Care packages and permanent RAC	0.2	0.9	1.1	1.0	0.8
	Care packages and respite and permanent RAC	0.5	0.9	0.9	0.9	0.8
	No ACAT-dependent programs	4.3	11.3	21.8	16.0	12.9
	Subtotal	*16.6*	*27.3*	*44.7*	*35.0*	*30.2*
All	Respite RAC only	9.5	8.0	6.1	7.2	7.8
	Care packages only	1.7	8.6	6.6	7.7	6.1
	Respite RAC and care packages	1.3	2.2	1.4	1.8	1.7
	Permanent RAC only	36.4	27.8	25.7	26.9	29.4
	Respite and permanent RAC	15.2	13.7	10.6	12.3	13.1
	Care packages and permanent RAC	0.5	2.5	1.8	2.2	1.7
	Care packages and respite and permanent RAC	1.0	2.4	1.5	2.0	1.7
	No ACAT-dependent programs	34.3	34.8	46.4	40.0	38.5
	Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total N		**27,545**	**42,920**	**34,428**	**77,348**	**104,893**

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference assessment is the first completed ACAT assessment in 2003–04.
3. HACC and VHC are combined for this table because as VHC delivers a subset of the HACC service type, and VHC clients are also often HACC clients. CACP and EACH(D) are combined because of the small number of EACH(D) packages and to aid presentation.
4. Components may not add to total due to rounding.

Table 3.2: Distinct aged care pathways over 2 years after reference ACAT assessment, PIAC new-pathways cohort (number)

Approach to counting distinct pathways	With HACC/VHC before	No previous care	Total	Ignoring early HACC/VHC use
A. Pathways showing all program use:				
• including				
– all episodes of care program use				
– all ACAT assessments				
– all with-in program transfers				
– death	5,933	4,810	10,743	9,200
B. Pathways showing care program use:				
• including				
– all episodes of care program use				
– death				
• excluding				
– ACAT assessments				
– with-in program transfers	1,361	1,258	2,619	2,030
C. Pathways showing care type changes:				
• including				
– changes in care program use				
– death				
• excluding				
– ACAT assessments				
– with-in program transfers				
• ignoring multiple program use when there has been no intervening use of another program.	686	372	1,358	1,003

Notes

1. Table excludes 89 records with a pathway that indicated death before receipt of care as this implies linkage errors.
2. Changes in HACC and VHC use prior to the first completed ACAT assessment are not considered.
3. Completed pathways (i.e. those ending in death) are distinguished from those still ongoing after 2 years.

3.3 Care transitions

The variety in the number and order of episodes of program use is illustrated in Figure 3.2 and Figure 3.3. These figures show, for the new-pathways cohort, the first three episodes of program use within 2 years of the reference assessment (as per Approach B in Table 3.2), split into those with and without previous use of HACC or VHC. The percentages in brackets show the proportion that made each particular transition.

Of the 34,400 cohort members who had not used HACC or VHC services prior to their reference assessment, 19% neither accessed any of the PIAC aged care programs nor died within 2 years of the assessment (group 2 in Figure 3.2). A further 6% died before accessing any care programs (group 1). As seen in Chapter 2, for a large proportion (41%) first care program use involved HACC or VHC services (group 3). Nearly one-fifth (19%) of people accessed permanent RAC first (group 81), while one in ten used respite RAC (group 32). Reflecting the smaller size of the community care package programs, just over 5% became care package recipients before doing anything else (group 57).

Whether people had more than one episode of care varied with the initial step. As expected, most people who went into permanent RAC either died (37%, group 83) or stayed in

permanent care for the remainder of the study period (57%, group 82). On the other hand, relatively few people beginning their care pathway on other programs died without a further care episode (between 5% and 10%: groups 5, 34 and 59). The proportion who had no further care episodes (i.e. the 'no change' groups) had a larger range, from 11% among those who accessed respite RAC only (group 33) to 43% of people who used only a care package (group 58).

The proportion of clients using a particular program at their second care episode depended on the first program accessed. For example, 43% of people who used respite RAC in the first episode next used permanent RAC (group 53), compared with 12–15% of those whose first episode involved community care (HACC, VHC or a care package: groups 27 and 77). Repeated access of HACC or VHC services and respite RAC was relatively common. In addition, evidence of use of respite RAC as a stepping stone into permanent RAC is seen in the high proportions of people who follow a period in respite care with admission into permanent RAC (see groups 26, 52, 53 and 76 in Figure 3.2).

As an ACAT assessment commonly leads to accessing HACC services, the pathways for people who first access HACC following their ACAT assessment (groups 3 to 31 in Figure 3.2) can be compared with those for the 42,900 members of the new-pathways cohort who had accessed HACC or VHC services before their 2003–04 reference assessment (Figure 3.3). An obvious difference between the two is the larger proportion among the 'no previous care' cohort who neither died nor accessed other care within 2 years: 29% versus 14% for the 'with previous care' group (group 4 in Figure 3.2 versus group 2 in Figure 3.3). This disparity is largely counter-balanced by the proportions going into permanent RAC: 25% among the cohort who had previously used HACC or VHC compared with 14% of those who had not (group 27 in Figure 3.2 versus group 86 in Figure 3.3). These differences could result from the older age and higher needs profiles of the 'with HACC/VHC' group, and again imply that members of this latter group were further along their 'care needs pathways' (see Appendix A).

Apart from the above differences, among other subsets the patterns of care in the two groups are alike. For example, the transition proportions following use of respite RAC after HACC or VHC were similar for those starting on HACC or VHC after the reference assessment (groups 20 to 26 in Figure 3.2) and for those who had used these services beforehand (following group 32 in Figure 3.3).

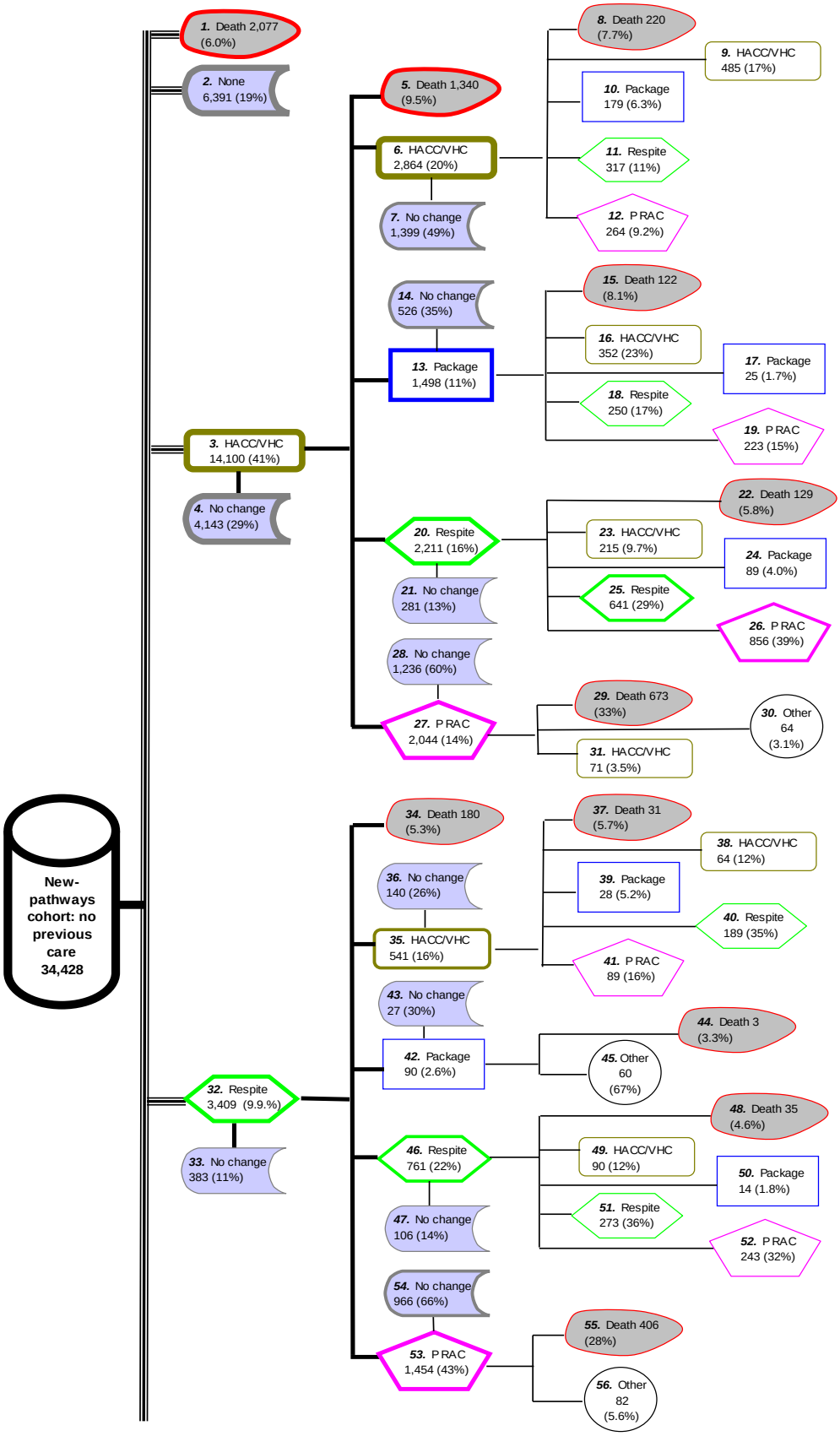
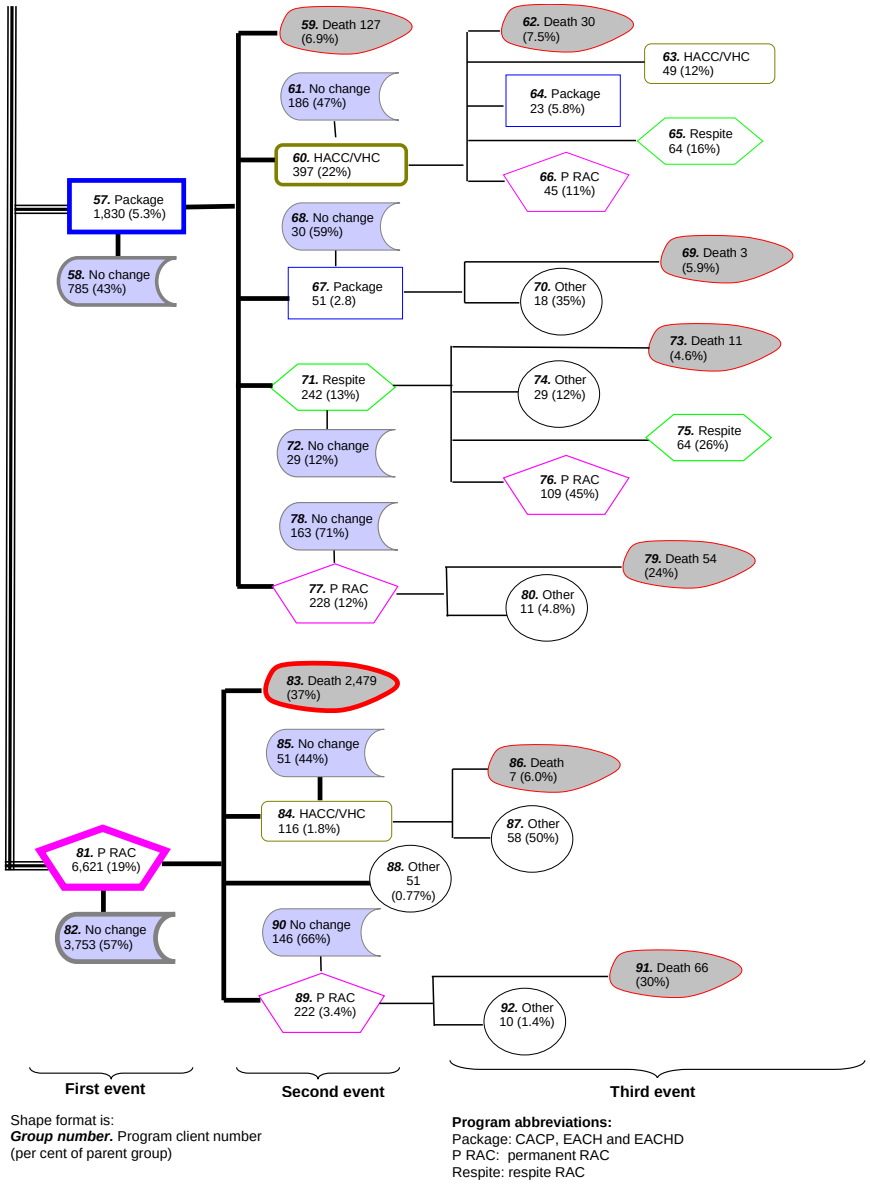


Figure 3.2: PIAC new-pathways cohort with no previous care before reference assessment: first three care events of care pathway within 2 years of first completed ACAT assessment in 2003–04



Note: Figure uses Approach B in Table 3.2. Width of shape's border indicates size of group. 'Package' includes CACP, EACH and EACHD.

Figure 3.2 (continued): PIAC new-pathways cohort with no previous care before reference assessment: first three care events of care pathway within 2 years of first completed ACAT assessment in 2003–04

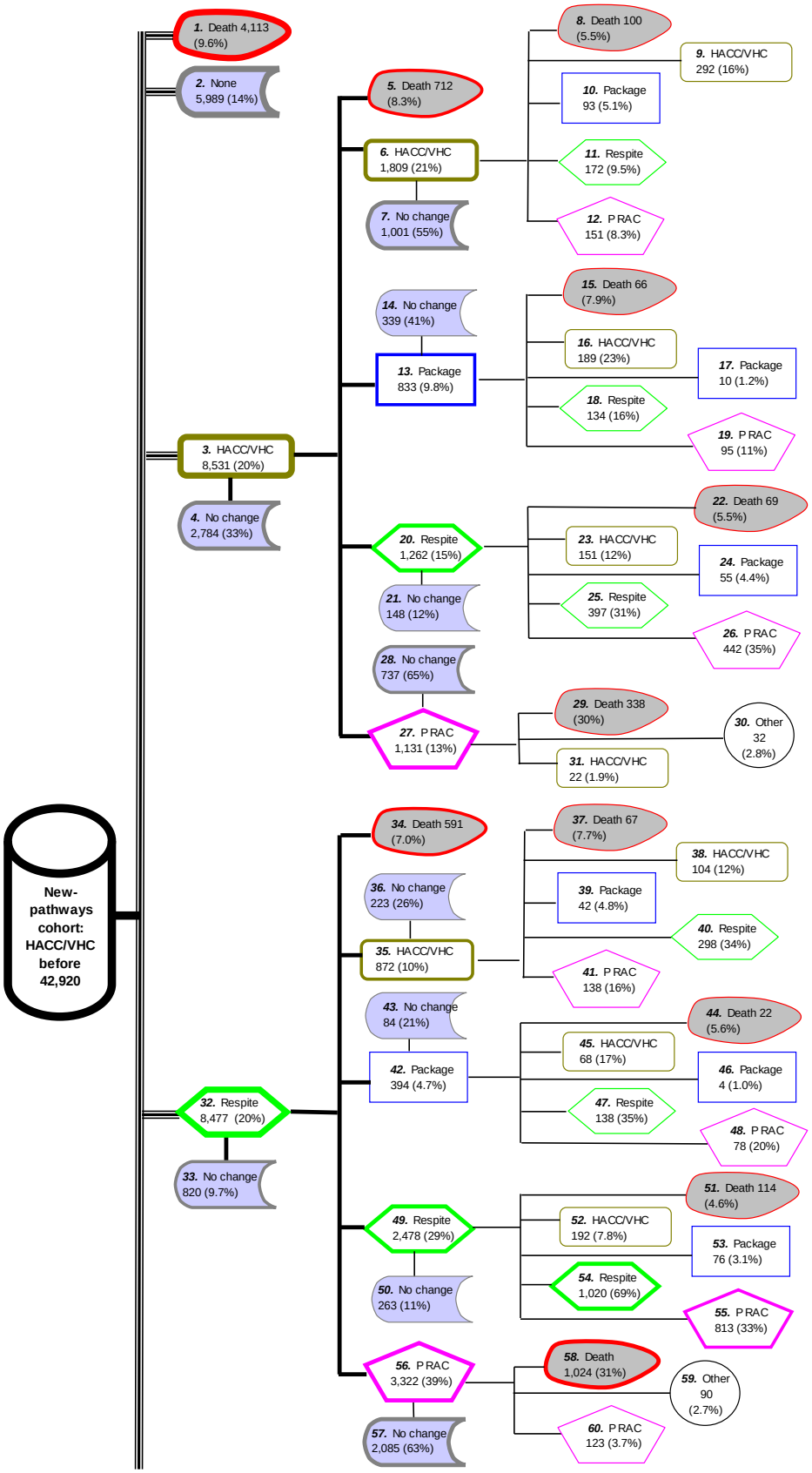
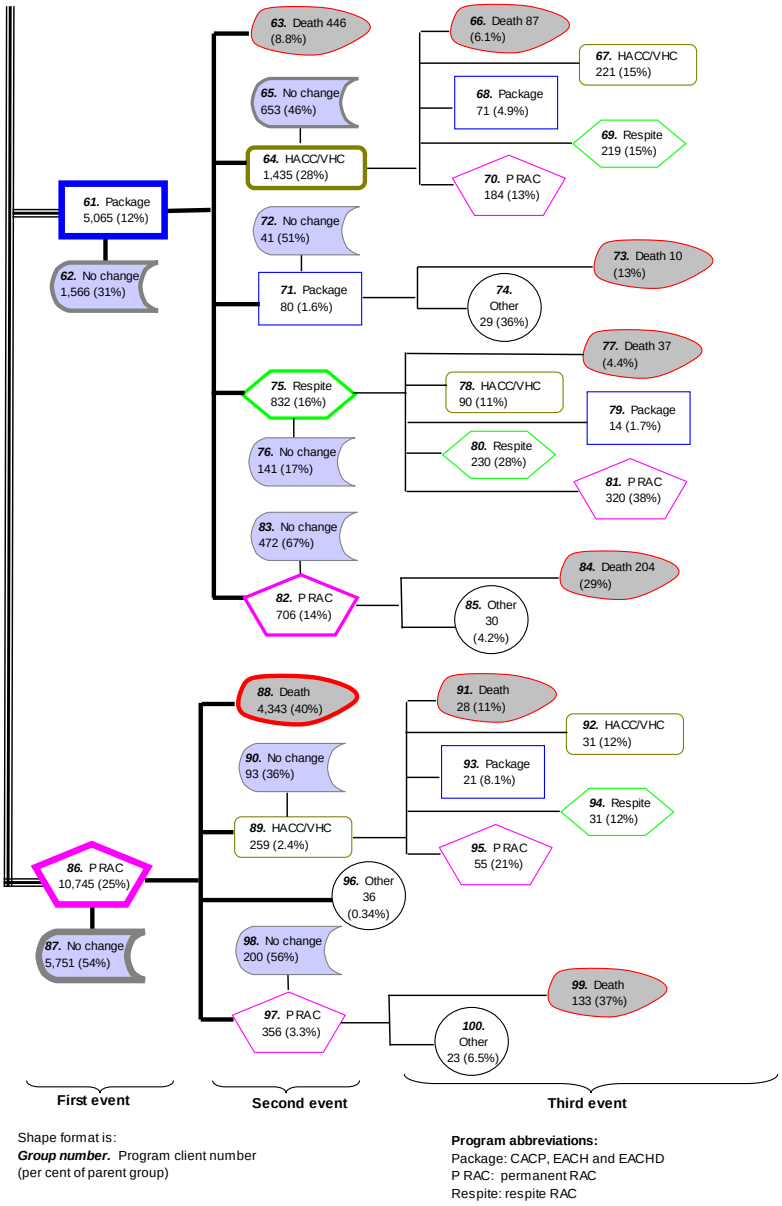


Figure 3.3: PIAC new-pathways cohort with HACC/VHC before reference assessment: first three care events of care pathway within 2 years of first completed ACAT assessment in 2003–04



Note: Figure uses Approach B in Table 3.2. Width of shape's border indicates size of group. 'Package' includes CACP, EACH and EACHD.

Figure 3.3 (continued): PIAC new-pathways cohort with HACC/VHC before reference assessment: first three care events of care pathway within 2 years of first completed ACAT assessment in 2003–04

3.4 Common care pathways

While there were many different care pathways, a relatively small set was used by a large proportion of the cohort. Looking at the first three care changes after the reference ACAT assessment (Approach C in Table 3.2), 14 combinations applied to 82% of cohort members (Table 3.3).

Overall, the most common path was the 'no change' path: 16% of the cohort were still alive 2 years after the reference assessment and had not newly accessed any care programs in that time (path A in Table 3.3). However, almost half (48%) of these clients had already accessed

HACC or VHC services beforehand, and use of these programs often continued after the ACAT assessment (see Chapter 4). Other paths followed by a relatively large proportion of the cohort included going into permanent residential care without accessing other services (paths B and D, accounting for 23% of the cohort, 40% of whom died), and only accessing HACC or VHC services (paths C and H, accounting for 14%, including those who died). Eight per cent of the cohort died before taking up any new program services; however, two-thirds of these people had accessed HACC or VHC services prior to their ACAT assessment (path E).

Highlighting the importance of community care in aged care pathways, use of either HACC or VHC was the first step in five of the 14 most common post-assessment pathways (paths C, H, I, L, M) (Table 3.3). These five paths were used by 28% of those with no previous care, and by 21% of all new-pathways cohort members. These findings again show that, in 2003–04, ACAP teams were acting as a conduit for information about these programs even though an ACAT approval was not required for access.

That respite RAC is also an integral part of the aged care system is indicated by its appearance in four of the top 14 pathways, with these paths being used by 13% of the cohort (paths F, J, K, L). Pathways incorporating respite RAC were more common among those who had accessed HACC or VHC before the reference assessment (16%) than among those who had not (10%). Use of respite care was often followed at a later date by admission into permanent residential care (paths F, K, L).

Table 3.3: PIAC new-pathways cohort: first three care changes for care pathways over 2 years after reference assessment

Path no.	First	Second	Third	With HACC/VHC before	No previous care	Total	All		[(a)]Per cent with HACC/VHC
					Per cent		N	Cum. %	
A	—	—	—	14.0	18.6	16.0	12,380	16.0	48.4
B	Perm. RAC	—	—	13.9	11.3	12.8	9,865	28.8	60.4
C	HACC/VHC	—	—	8.9	14.8	11.5	8,893	40.3	42.9
D	Perm. RAC	Death	—	10.4	7.4	9.1	7,028	49.3	63.8
E	Death	—	—	9.6	6.0	8.0	6,190	57.3	66.4
F	Resp. RAC	Perm. RAC	—	7.3	3.7	5.7	4,396	63.0	70.9
G	CACP	—	—	3.6	2.3	3.0	2,313	66.0	65.9
H	HACC/VHC	Death	—	1.8	4.2	2.9	2,228	68.9	35.5
I	HACC/VHC	Perm. RAC	—	1.9	4.0	2.8	2,196	71.7	37.9
J	Resp. RAC	—	—	3.4	1.6	2.6	2,002	74.3	71.9
K	Resp. RAC	Perm. RAC	Death	3.2	1.5	2.5	1,912	76.8	72.9
L	HACC/VHC	Resp. RAC	Perm. RAC	1.6	3.6	2.5	1,911	79.3	35.3
M	HACC/VHC	Perm. RAC	Death	0.9	2.1	1.4	1,080	80.7	34.2
N	CACP	HACC/VHC	—	1.8	0.6	1.3	1,013	82.0	78.1
	All other paths			*17.8*	*18.3*	*18.0*	*13,941*	*100.0*	*54.7*
	Total			**100.0**	**100.0**	**100.0**	**77,348**	**. .**	**55.5**
	Number of distinct paths used			**123**	**113**	**132**	**. .**	**. .**	**. .**

(a) For some people access to HACC/VHC may have continued after the reference ACAT assessment.

Notes

1. Table uses pathway definition C in Table 3.2.
2. Table excludes 89 records with a pathway that indicated death before receipt of care as this implies linkage errors.
3. Changes in HACC and VHC use prior to the first completed ACAT assessment are not considered. All ACAT assessments, transfers due to a change in service provider and multiple program use when there has been no intervening use of another program are also not considered.
4. HACC and VHC are combined for this table as VHC delivers a subset of the HACC service types.
5. Completed pathways (i.e. those ending in death) are distinguished from those still ongoing after 2 years.

4 Changes over time

Linking program data which includes information on dates of program use allows us to look at time to key events, changes in use of care programs over time and at concurrent use of programs.

4.1 Summary

Among the new-pathways cohort:

- Nearly 13% had accessed a CACP within 1 year of their reference assessment, and 43% had been admitted to permanent residential aged care.
- The first 3 months after the reference assessment saw the largest take-up rates for both packaged and residential care.
- Take-up rates were higher among those who had previously used HACC and VHC, as were death rates. These results support the hypothesis that new-pathways cohort members with no previous care were not as advanced along their 'care needs pathway' as other members.

As expected, the service use profile of the cohort groups changed over time:

- In all PIAC groups, the proportions of living cohort members in permanent RAC increased over time. The increase in use of permanent RAC was accompanied by relative decreases in the use of respite RAC, and, more noticeably, HACC.
- At the time of their reference assessment, 41% of the continuing path group were in permanent RAC, 28% were on a care package and 15% were using HACC or VHC only. Within 2 years, 39% of these people had died; 70% of those still alive were in permanent residential care and 14% were package recipients. A further 7% were using HACC and/or VHC services.
- People who had not used aged care services before their reference assessment were less likely than others to take up these services within the study period. In the 2-year period after the ACAT assessment, just over a quarter of this group died; 34% of those still alive after 2 years were in permanent residential care, 8% were in receipt of a community care package and 15% were HACC or VHC clients only.
- Concurrent use of HACC services was common among community care package recipients and VHC clients.
- Because of its short term nature, at any one time few people were in residential respite care (always under 3%). However, for all cohort groups and at all time periods considered, more than half of those in respite RAC were accessing at least one community care program when they were at home.
- Two-fifths (39%) of the continuing path group died within 2 years of their reference ACAT assessment, as did 32% of the new-pathways cohort who had used HACC or VHC before and 27% of those who had not previously used aged care programs.

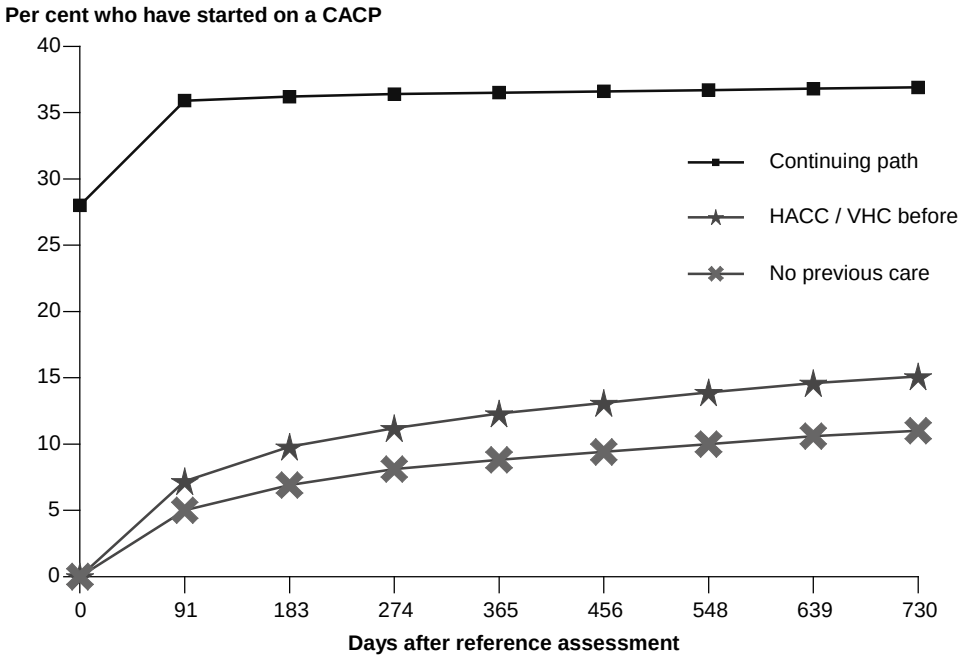
4.2 Time to care

Two ways of looking at program use by individuals over time are examined:

- the time to using particular care programs after the reference assessment, and
- changing program use over time.

In this section we look at the first of these. The second perspective is considered in the next section.

Time to use of the two key ACAT-dependent programs—CACPs and permanent RAC—are explored below. In this analysis, use of particular services is considered for all cohort members, including those who did not access services for which they were approved and those who may not have originally been given approvals for some services.[3] Consequently, we are examining elapsed time from the reference assessment to program use, and not elapsed time from the ACAT approval for use of a particular program. The resulting measure is different from waiting time, as ideally a measure of waiting time only includes people with a particular approval and would exclude periods in which factors other than service availability affected the take-up of services. Such factors include unwillingness to use particular service providers, changes in social or health circumstances and death of the potential client.



Source: Table 4.1.

Figure 4.1: Take up of CACPs over time, by PIAC cohort group (per cent of group)

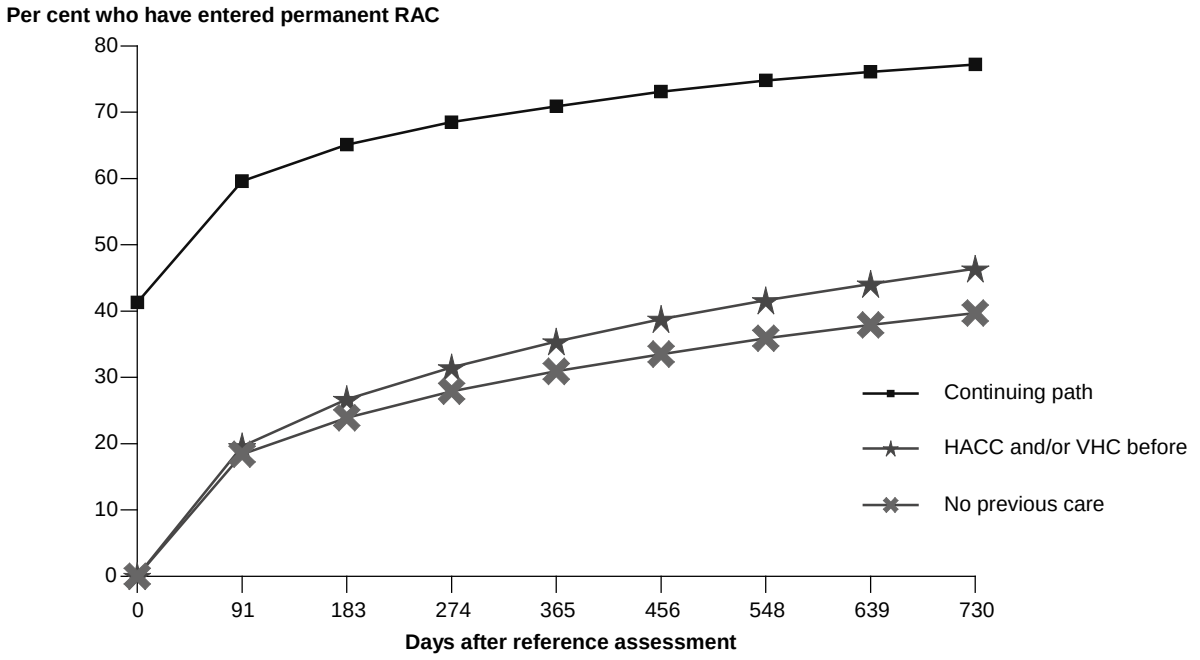
3 The data reported here include clients who did not access services and so are not comparable with those reported in SCRGSP 2009.

Over one-quarter (28%) of those continuing on their path were recipients of a CACP at the start of their reference ACAT assessment, and two-fifths (41%) were in permanent residential aged care (Table 4.1, Table 4.2). Within 3 months after the assessment a further 8%began on a package. However, very few did so after that, and only an additional 1% started on a CACP between 3 and 24 months after assessment (Figure 4.1).

While many (18%) among the continuing path group were admitted to permanent residential care in the 3 months after assessment, unlike starts on CACPs, admissions continued over time in steadily decreasing numbers (Figure 4.2). In the 2 years after assessment, 36% of this group entered permanent presidential care, so that by the end of the study period 77% had been in permanent residential care.

Nearly 11% of the new-pathways cohort had accessed a CACP within 1 year of their reference ACAT assessment, with a further 2% taking up a package in the following year (Table 4.1). People who had previously used HACC or VHC services were more likely to take up a community care package than those who had not: 12% within a year versus 9% (Figure 4.1). For both groups, just under 60% of these moves in the first year onto a package happened within 3 months of the reference assessment.

As with the continuing path group, admission into permanent residential care was common among the PIAC new-pathways members in the 2 years after their reference assessment: 46% of those who had previously used HACC or VHC, and 40% of those who had not, had been admitted to permanent residential care within 2 years of their reference assessment. The majority of admissions were within 1 year (Table 4.2 , Figure 4.2). For both groups, over two-fifths of first admissions in the period were within 3 months of the assessment; however, within each quarter the proportions entering permanent RAC were smaller among those with no previous care than among those who had accessed HACC or VHC.



Source: Table 3.2.

Figure 4.2: Movement into permanent RAC over time, by PIAC cohort group (per cent of group)

The above results may seem counter-intuitive; that is, that the new-pathways group which had not previously used HACC or VHC had both lower admission rates into community care packages and permanent RAC than those who had used these community care services. However, analysis in Appendix A shows that people with no previous care had a younger age profile than other new-pathways members (Table A.5). In addition, people with no previous use of care programs seemed to have fewer care needs, averaging fewer health conditions and slightly lower care need scores (Table A.18, Table A.19 and Table A.20). The tendency seen in Chapter 2 for an ACAT assessment to provide a pathway into HACC (and to a lesser extent, VHC) also suggests that that new-pathways cohort members with no previous care were not as advanced along their 'care needs pathway' as other cohort members, and so would be expected to have longer periods before admission into packages or residential care. The higher death rate among the latter group (discussed in the next section) corroborates this hypothesis.

Table 4.1: PIAC cohort: Time to starting on a CACP after reference assessment, by PIAC group (per cent)

Time after completion of reference ACAT assessment	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	All	Total number
In CACP at start of assessment	*28.0*	*. .*	*. .*	*. .*	*. .*	*7,720*
Q1: ≤ 91 days	7.9	7.2	5.0	6.2	6.7	6,978
Q2: 92–183 days	0.3	2.6	1.9	2.3	1.8	1,844
Q3: 184–274 days	0.2	1.4	1.2	1.3	1.0	1,054
Q4: 275–365 days	0.1	1.1	0.7	0.9	0.7	765
Within 1 year	*36.4*	*12.3*	*8.8*	*10.8*	*17.5*	*18,361*
Q5: 366–456 days	0.1	0.8	0.6	0.7	0.6	577
Q6: 457–548 days	0.1	0.7	0.6	0.6	0.5	504
Q7: 549–639 days	0.1	0.5	0.4	0.5	0.4	395
Q8: 640–730 days	0.1	0.6	0.4	0.5	0.4	385
Within 1 to 2 years	*0.3*	*2.6*	*2.0*	*2.3*	*1.8*	*1,861*
Within 2 years	*36.7*	*14.9*	*10.8*	*13.1*	*19.3*	*20,222*
No event	63.3	85.1	89.2	86.9	80.7	84,671
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**27,545**	**42,920**	**34,428**	**77,348**	**. .**	**104,893**

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference date is the date of the end of the first completed ACAT assessment in 2003–04.

Table 4.2: PIAC cohort: Time to entry into permanent care after reference assessment, by PIAC group (per cent)

Time after completion of reference ACAT assessment	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	All	Total number
In permanent RAC at start of assessment	*41.3*	*. .*	*. .*	*. .*	*10.8*	*11,377*
Q1: ≤ 91 days	18.3	19.6	18.4	19.1	18.9	19,777
Q2: 92–183 days	5.5	7.1	5.5	6.4	6.2	6,479
Q3: 184–274 days	3.4	4.8	4.0	4.4	4.2	4,359
Q4: 275–365 days	2.4	3.9	3.0	3.5	3.2	3,372
Within 1 year	*70.9*	*35.5*	*30.8*	*33.4*	*43.2*	*45,364*
Q5: 366–456 days	2.2	3.4	2.6	3.0	2.8	2,918
Q6: 457–548 days	1.7	2.8	2.4	2.6	2.4	2,481
Q7: 549–639 days	1.3	2.5	2.0	2.3	2.0	2,110
Q8: 640–730 days	1.1	2.3	1.8	2.1	1.8	1,910
Within 1 to 2 years	*6.4*	*10.9*	*8.7*	*9.9*	*9.0*	*9,419*
Within 2 years	*77.3*	*46.4*	*39.5*	*43.3*	*52.2*	*54,783*
No event	22.7	53.6	60.5	56.7	47.8	50,110
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**104,893**
Total (number)	**27,545**	**42,920**	**34,428**	**77,348**	**104,893**	

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference date is the date of the end of the first completed ACAT assessment in 2003–04.

4.3 Changes in program use over time

As seen above, and as expected, use of care programs by cohort members increased over time. In the following analysis we look at the changing use of aged care services over time by examining the programs being used at selected points after assessment. People who had died before each time point are not included in the related percentages to aid the discussion. Overall, one-fifth of the PIAC cohort died within 1 year of the reference assessment, and another 12% died the following year (Table 4.8).

For people who had accessed aged care services prior to their reference assessment, the proportion of live clients accessing a care program levelled off at about 12 months after the assessment, at just over 92% for the continuing path group a (Figure 4.3). At the time of their reference assessment, 41% of this group were in permanent RAC, 28% were on a care package and 15% were using HACC or VHC only. Within 2 years, 39% of these people had died, and 70% of those still alive were in permanent residential care and 14% were package recipients (Table 4.4). A further 7% were using HACC and/or VHC services.

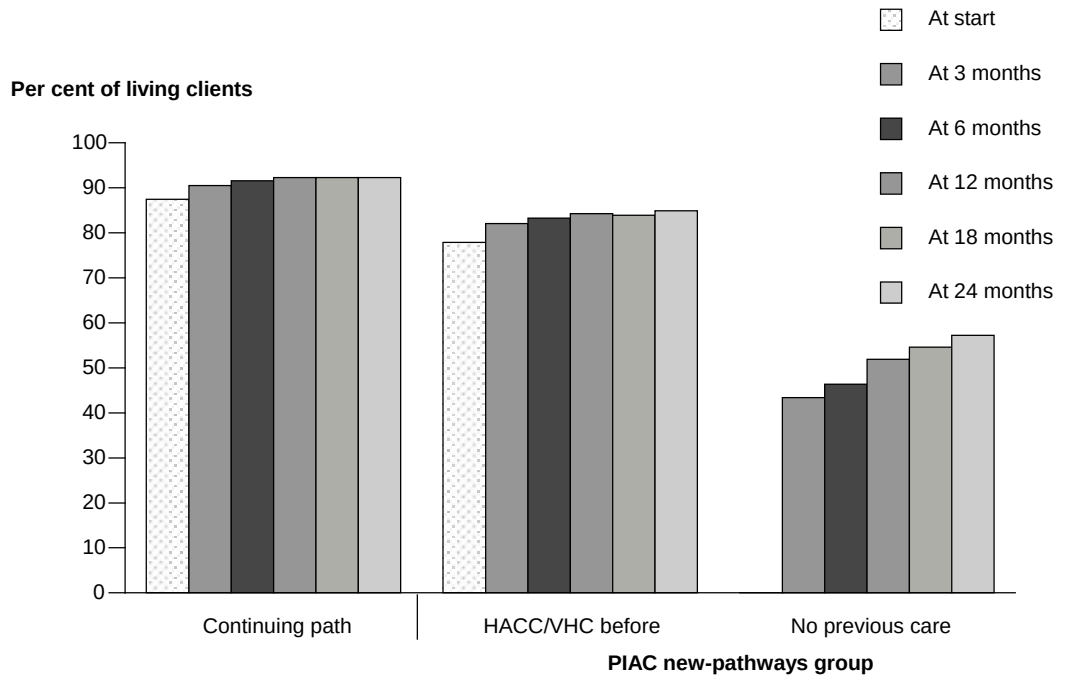
Among the new-pathways cohort who had used HACC or VHC services before their reference assessment, the proportion using care services increased from 78% at the reference assessment to around 85–86% of live clients 1 year later, where it remained for the next year (Table 4.6). After 2 years, nearly one-third of this group had died; of the remaining two-

thirds, 42% were in permanent residential care, 12% were care package recipients and 35% were accessing HACC and/or VHC services (some in conjunction with a care package).

People who had not used aged care services before their reference assessment were less likely than others to take up these services within the study period. However, a considerable proportion did, with the proportions accessing services slowing down over time but not levelling off within 2 years as it did for the other two groups (Figure 4.3). Three months after assessment, 17% of this 'no previous care' group who were still alive were in permanent residential care, 5% were using a care package and 21% were in receipt of HACC and/or VHC services (including a small proportion who were also package recipients). Two years after the reference assessment just over a quarter of the group had died; 34% of those still alive were in permanent residential care, 8% were in receipt of a community care package and 15% were HACC or VHC clients only.

In all PIAC groups, the proportions in permanent RAC increased over time (Table 4.3). For the two new-pathways groups, the proportion of living cohort members who were in permanent RAC more than doubled between 3 and 24 months after the reference assessment. And even among people who were continuing their path at the time of the reference assessment the proportion in permanent RAC rose from 54% after 3 months to 70% after 2 years. The increase in use of permanent RAC was accompanied by relative decreases in the use of respite RAC, and, more noticeably, HACC. At the time of the reference assessment, 78% of the 'HACC/VHC before' new-pathways group were using HACC or VHC services compared with 35% 2 years later. For the other two PIAC groups, the proportion using HACC or VHC decreased—from 25% at assessment to 12% at 24 months after the reference assessment among the continuing path group, and from 21% at 3 months to 17% at 24 months among those with no previous care.

The proportion of people receiving CACPs decreased over time among people who had already accessed ACAT-dependent services prior to the reference assessment. In contrast, in the new-pathways groups the proportions on CACPs increased over the 2-year period, steadying after 12 months at around 11% among those who had previously used HACC or VHC and at just over 7% among those who had not. The proportion on EACH or EACHD packages increasing gradually over time for all groups, most likely reflecting the more than ten-fold growth in program places between 2003 and 2006 (AIHW 2007a:133).



Source: Table 4.3.

Figure 4.3: Proportion of people using aged care programs over time, by PIAC cohort group (per cent of living cohort at time point)

4.4 Concurrent program use

People who are recipients of a CACP can also access certain services from other community care programs. In particular, CACP recipients may access HACC for nursing and allied health services, and for centre-based day care. Recipients of EACH and EACHD packages can also use HACC-provided centre-based day care. In addition, clients of community care services may use residential respite care, and eligible veterans can access in-home respite care and emergency short-term respite under VHC.

Six months after assessment, 19% of the continuing path group were CACP recipients, with around one-third of these people also being HACC or VHC clients (7% of the cohort who were still alive) (Table 4.3 and Table 4.4). Interestingly, just over one-third of the continuing path group using HACC or VHC services at 6 months were also a package recipient (6.4% out of 18.1%). Use of packages among HACC clients was much lower for the other cohort groups.

For the new-pathways cohort who had previously used HACC or VHC, just over one-third of the 9% on a CACP after 6 months were also accessing HACC or VHC services (Table 4.6). In contrast, fewer than one in six of the new-pathways group with no previous care who were on a CACP after 6 months were also using HACC or VHC services (1.0% out of 6.4%).[4]

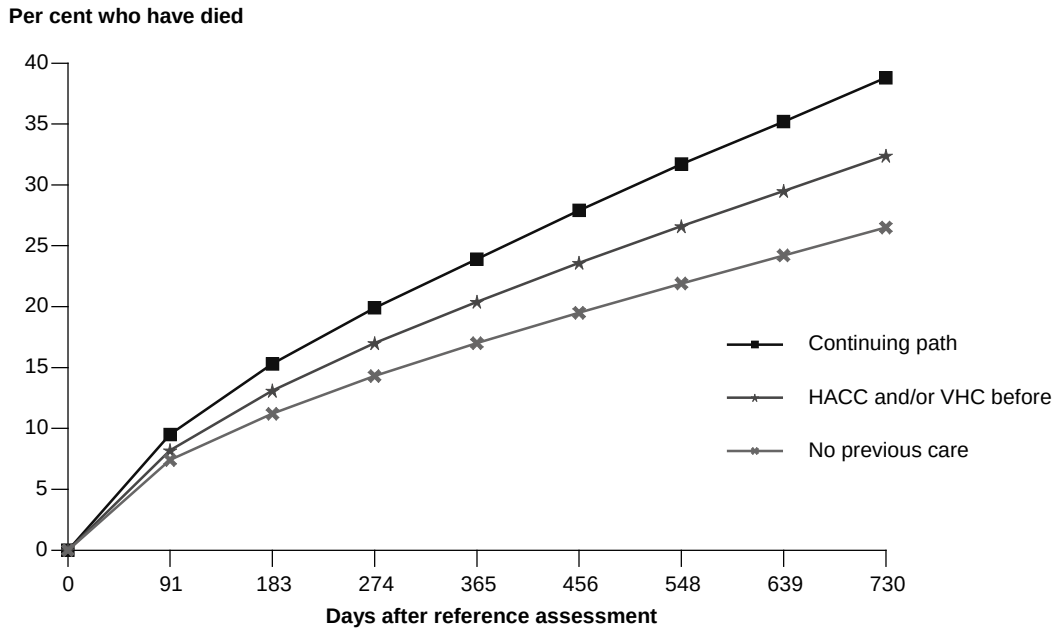
4 Previous analysis looking at concurrent use of CACP and HACC estimated that around 35% of CACP recipients had concurrent use of HACC (AIHW: Karmel & Braun 2004). The lower levels found here (considering that VHC is also included) is explained by more detailed data preparation carried out on HACC service use data for the PIAC project.

A similar pattern was seen at 24 months after assessment (Table 4.7). Similar comparisons cannot be made for EACH and EACHD recipients due the small numbers involved.

Reflecting the more limited nature of VHC, overlap between VHC and HACC was also quite common, with 25–40% of people who were VHC clients at the 6 month point also accessing HACC services, depending on the PIAC group (Table 4.3, Table 4.4, Table 4.6 and Table 4.7). On the other hand, fewer than one in 16 people using the large HACC program were also accessing VHC services.

Although use of respite RAC was among the first three care types used for over 13% of the new-pathways cohort (Table 3.3), at any one time few people were using this service. This reflects its short term nature. At 6 months after the reference assessment less than 1.5% of the new-pathways groups who were still alive were accessing residential respite care at any one time. Among those continuing their path, nearly 3% were in respite RAC at the start of their reference assessment. This had dropped to 1.5% at 12 months after the assessment. However, for all cohort groups and at all time periods considered, more than half of those in respite RAC were accessing at least one community care program when they were at home.

Analysis in Section 4.3 showed that a substantial proportion of the PIAC cohort had not used CACPs or entered permanent RAC within 2 years of their reference assessment. In fact, some people never use such care, dying before they need to (or can) take up such care. Two-fifths (39%) of the continuing path group died within 2 years of the reference assessment, 32% of the new-pathways cohort who had used HACC or VHC died, as did 27% of those who had no previous care. Within each quarterly period, the death rate was highest among those in the continuing path group and lowest among people who had not accessed care programs before their reference assessment. In all three PIAC groups, the highest death rate occurred in the 3 months immediately after assessment (Table 4.8, Figure 4.4).



Source: Table 4.8.

Figure 4.4: Deaths over time, by PIAC cohort group (per cent of group)

Table 4.3: PIAC cohort: summary of program use at specific intervals from reference assessment

Programs being used	Program use at start of assessment	Care program use at time after end of reference assessment:				
		3 months	6 months	12 months	18 months	24 months
Continuing path		Per cent of clients alive at the time				
Not using a care program	12.5	9.5	8.4	7.7	7.7	7.7
Permanent RAC	41.3	54.0	59.2	64.6	68.1	70.0
Any HACC	*23.8*	*19.4*	*17.2*	*14.6*	*12.5*	*11.5*
Any VHC	*2.2*	*1.8*	*1.6*	*1.4*	*1.1*	*1.0*
Any HACC/VHC	*25.0*	*20.5*	*18.1*	*15.4*	*13.1*	*12.1*
Any CACP	*28.0*	*21.5*	*19.2*	*16.3*	*14.3*	*13.0*
Any EACH(D)	*0.4*	*0.8*	*0.9*	*1.0*	*1.2*	*1.4*
Any respite RAC	*2.9*	*2.8*	*2.1*	*1.5*	*1.2*	*1.2*
Deaths as per cent of clients alive at previous time point	—	9.3	6.4	10.2	10.2	10.4
Clients alive at time (number)	27,544	24,978	23,373	21,000	18,862	16,891
HACC/VHC before						
Not using a care program	22.1	17.9	16.7	15.7	16.1	15.1
Permanent RAC	. .	18.0	24.4	32.1	37.7	42.0
Any HACC	*71.9*	*53.8*	*47.8*	*40.8*	*34.9*	*31.6*
Any VHC	*9.3*	*8.2*	*7.4*	*6.3*	*5.5*	*5.1*
Any HACC/VHC	*77.9*	*58.5*	*52.1*	*44.5*	*38.2*	*34.8*
Any CACP	*. .*	*7.1*	*9.3*	*10.7*	*10.9*	*11.0*
Any EACH(D)	*. .*	*0.2*	*0.3*	*0.4*	*0.5*	*0.7*
Any respite RAC	*. .*	*2.3*	*1.5*	*1.2*	*1.1*	*0.9*
Deaths as per cent of clients alive at previous time point	—	8.0	5.4	8.4	7.7	8.0
Clients alive at time (number)	42,920	39,505	37,358	34,217	31,573	29,055
No previous care						
Not using a care program	100.0	56.6	53.6	48.1	45.4	42.8
Permanent RAC	. .	16.6	21.1	26.9	31.0	34.0
Any HACC	*. .*	*20.2*	*17.9*	*17.1*	*15.5*	*15.3*
Any VHC	*. .*	*1.5*	*1.5*	*1.5*	*1.6*	*1.7*
Any HACC/VHC	*. .*	*21.2*	*19.0*	*18.3*	*16.8*	*16.5*
Any CACP	*. .*	*4.9*	*6.4*	*7.2*	*7.5*	*7.4*
Any EACH(D)	*. .*	*0.1*	*0.2*	*0.3*	*0.4*	*0.5*
Any respite RAC	*. .*	*1.7*	*1.0*	*0.9*	*0.6*	*0.7*
Deaths as per cent of clients alive at previous time point	—	7.3	4.1	6.5	5.9	5.9
Clients alive at time (number)	34,428	31,911	30,610	28,615	26,919	25,331

Note: Clients may use more than one program at a time, and so percentages do not sum to 100. Fewer than five clients were using Transition Care at the 18 and 24 month time points, respectively. This is not shown in the table.

Table 4.4: PIAC continuing path cohort: program use at specific intervals from ACAT reference assessment

Programs being used	Program use at start of assessment	Care program use at time after end of reference assessment:				
		3 months	6 months	12 months	18 months	24 months
		Per cent of clients alive at the time				
Not using a care program	12.5	9.5	8.4	7.7	7.7	7.7
HACC only	13.6	10.8	9.5	8.2	7.0	6.3
VHC only	1.0	0.8	0.7	0.6	0.5	0.4
HACC and VHC only	0.8	0.6	0.6	0.5	0.4	0.4
HACC and/or VHC only	*15.4*	*12.2*	*10.8*	*9.3*	*7.9*	*7.2*
CACP only	19.1	13.8	12.6	10.8	9.4	8.6
CACP and HACC/VHC only	8.4	6.9	6.0	5.1	4.5	4.1
EACH(D) only	0.3	0.7	0.8	0.8	1.0	1.1
EACH(D) and HACC/VHC only	0.0	0.1	0.1	0.1	0.1	0.2
Respite RAC only	1.3	0.9	0.6	0.4	0.3	0.3
Respite RAC and HACC/VHC only	1.1	1.0	0.9	0.6	0.4	0.5
Respite RAC and CACP/EACH(D) only	0.4	0.6	0.4	0.3	0.3	0.3
Respite RAC, CACP/EACH(D) and HACC/VHC	0.1	0.3	0.3	0.2	0.2	0.1
Permanent RAC	41.3	54.0	59.2	64.6	68.1	70.0
Any HACC	*23.8*	*19.4*	*17.2*	*14.6*	*12.5*	*11.5*
Any VHC	*2.2*	*1.8*	*1.6*	*1.4*	*1.1*	*1.0*
Any HACC/VHC	*25.0*	*20.5*	*18.1*	*15.4*	*13.1*	*12.1*
Any CACP	*28.0*	*21.5*	*19.2*	*16.3*	*14.3*	*13.0*
Any EACH(D)	*0.4*	*0.8*	*0.9*	*1.0*	*1.2*	*1.4*
Any respite RAC	*2.9*	*2.8*	*2.1*	*1.5*	*1.2*	*1.2*
Clients alive at time (number)	**27,544**	**24,978**	**23,373**	**21,000**	**18,862**	**16,891**
Deaths						
Clients who died in the time period (number)	[(a)]<3	2,566	1,605	2,373	2,138	1,971
Deaths as per cent of all clients	—	9.3	5.8	8.6	7.8	7.2
Deaths as per cent of clients alive at previous time point	—	9.3	6.4	10.2	10.2	10.4

(a) Relates to clients dying on the day that the assessment started.

Note: Clients may use more than one program at a time, and so percentages do not sum to 100. In addition, fewer than three clients were using Transition Care at the 24 month time point. This is not shown in the table.

Table 4.5: PIAC new-pathways cohort: program use at specific intervals from reference ACAT assessment

Programs being used	Program use at start of assessment	Care program use at time after end of reference assessment:				
		3 months	6 months	12 months	18 months	24 months
		Per cent of clients alive at the time				
Not using a care program	56.8	35.2	33.3	30.4	29.6	28.0
HACC only	38	34.1	29.7	25.5	21.7	19.8
VHC only	3.3	3.0	2.8	2.4	2.3	2.1
HACC and VHC only	1.8	2.1	1.8	1.5	1.3	1.2
HACC and/or VHC only	*43.2*	*39.1*	*34.3*	*29.5*	*25.3*	*23.2*
CACP only	. .	4.3	5.7	6.5	6.7	6.6
CACP and HACC/VHC only	. .	1.7	2.2	2.5	2.5	2.6
EACH(D) only	. .	0.2	0.2	0.3	0.4	0.5
EACH(D) and HACC/VHC only	. .	—	—	—	0.1	0.1
Respite RAC only	. .	1.0	0.5	0.4	0.3	0.3
Respite RAC and HACC/VHC only	. .	0.9	0.6	0.5	0.4	0.4
Respite RAC and CACP/EACH(D) only	. .	0.1	0.1	0.1	0.1	0.1
Respite RAC, CACP/EACH(D) and HACC/VHC	. .	—	—	—	0.1	0.1
Permanent RAC	. .	17.4	22.9	29.7	34.6	38.2
Any HACC	*39.9*	*38.8*	*34.3*	*30*	*26*	*24*
Any VHC	*5.2*	*5.2*	*4.7*	*4.1*	*3.7*	*3.5*
Any HACC/VHC	*43.2*	*41.9*	*37.2*	*32.6*	*28.3*	*26.3*
Any CACP	*. .*	*6.1*	*8.0*	*9.1*	*9.3*	*9.3*
Any EACH(D)	*. .*	*0.2*	*0.3*	*0.3*	*0.5*	*0.6*
Any respite RAC	*. .*	*2.0*	*1.2*	*1.1*	*0.9*	*0.8*
Clients alive at time (number)	**77,348**	**71,416**	**67,968**	**62,832**	**58,492**	**54,386**
Deaths						
Clients who died in the time period (number)	—	5,932	3,448	5,136	4,340	4,106
Deaths as per cent of all clients	—	7.7	4.5	6.6	5.6	5.3
Deaths as per cent of clients alive at previous time point	—	7.7	4.8	7.6	6.9	7.0

Note: Clients may use more than one program at a time, and so percentages do not sum to 100. Fewer than five clients were using Transition Care at the 18 month time point and 24 month time point. This is not shown in the table.

Table 4.6: PIAC new-pathways cohort with previous use of HACC or VHC: program use at specific intervals from reference ACAT assessment

Programs being used	Program use at start of assessment	Care program use at time after end of reference assessment:				
		3 months	6 months	12 months	18 months	24 months
		Per cent of clients alive at the time				
Not using a care program	22.1	17.9	16.7	15.7	16.1	15.1
HACC only	68.6	46.7	40.8	34.0	28.6	25.7
VHC only	6.0	4.5	4.1	3.5	3.2	3.0
HACC and VHC only	3.3	3.4	3.0	2.6	2.1	1.9
HACC and/or VHC only	*77.9*	*54.6*	*48.0*	*40.1*	*33.9*	*30.5*
CACP only	. .	4.5	6.0	7.0	7.2	7.2
CACP and HACC/VHC only	. .	2.5	3.1	3.6	3.6	3.6
EACH(D) only	. .	0.2	0.3	0.4	0.4	0.6
EACH(D) and HACC/VHC only	. .	—	—	—	0.1	0.1
Respite RAC only	. .	0.8	0.4	0.3	0.3	0.2
Respite RAC and HACC/VHC only	. .	1.4	0.9	0.7	0.6	0.5
Respite RAC and CACP/EACH(D) only	. .	0.1	0.1	0.1	0.2	0.1
Respite RAC, CACP/EACH(D) and HACC/VHC	. .	—	0.1	0.1	0.1	0.1
Permanent RAC	. .	18.0	24.4	32.1	37.7	42.0
Any HACC	*71.9*	*53.8*	*47.8*	*40.8*	*34.9*	*31.6*
Any VHC	*9.3*	*8.2*	*7.4*	*6.3*	*5.5*	*5.1*
Any HACC/VHC	*77.9*	*58.5*	*52.1*	*44.5*	*38.2*	*34.8*
Any CACP	*. .*	*7.1*	*9.3*	*10.7*	*10.9*	*11.0*
Any EACH(D)	*. .*	*0.2*	*0.3*	*0.4*	*0.5*	*0.7*
Any respite RAC	*. .*	*2.3*	*1.5*	*1.2*	*1.1*	*0.9*
Clients alive at time (number)	**42,920**	**39,505**	**37,358**	**34,217**	**31,573**	**29,055**
Deaths						
Clients who died in the time period (number)	0	3,415	2,147	3,141	2,644	2,518
Deaths as per cent of all clients	0.0	8.0	5.0	7.3	6.2	5.9
Deaths as per cent of clients alive at previous time point	0.0	8.0	5.4	8.4	7.7	8.0

Note: Clients may use more than one program at a time, and so percentages do not sum to 100. Fewer than three clients were using Transition Care at the 18 month time point and 2 at the 24 month time point. This is not shown in the table.

Table 4.7: PIAC new-pathways cohort with no previous care: program use at specific intervals from reference ACAT assessment

Programs being used	Program use at start of assessment	Care program use at time after end of reference assessment:				
		3 months	6 months	12 months	18 months	24 months
		Per cent of clients alive at the time				
Not using a care program	100.0	56.6	53.6	48.1	45.4	42.8
HACC only	. .	18.6	16.2	15.3	13.7	13.2
VHC only	. .	1.0	1.1	1.1	1.2	1.2
HACC and VHC only	. .	0.4	0.4	0.3	0.3	0.4
HACC and/or VHC only	. .	20.0	17.7	16.8	15.2	14.8
CACP only	. .	4.1	5.4	5.9	6.1	5.9
CACP and HACC/VHC only	. .	0.8	1.0	1.2	1.3	1.4
EACH(D) only	. .	0.1	0.2	0.2	0.3	0.4
EACH(D) and HACC/VHC only	. .	0.0	—	—	0.1	0.1
Respite RAC only	. .	1.2	0.6	0.5	0.3	0.3
Respite RAC and HACC/VHC only	. .	0.4	0.3	0.3	0.2	0.2
Respite RAC and CACP/EACH(D) only	. .	—	0.1	0.1	0.1	0.1
Respite RAC, CACP/EACH(D) and HACC/VHC	. .	—	—	—	—	—
Permanent RAC	. .	16.6	21.1	26.9	31.0	34.0
Any HACC	. .	20.2	17.9	17.1	15.5	15.3
Any VHC	. .	1.5	1.5	1.5	1.6	1.7
Any HACC/VHC	. .	21.2	19.0	18.3	16.8	16.5
Any CACP	. .	4.9	6.4	7.2	7.5	7.4
Any EACH(D)	. .	0.1	0.2	0.3	0.4	0.5
Any respite RAC	. .	1.7	1.0	0.9	0.6	0.7
Clients alive at time (number)	**34,428**	**31,911**	**30,610**	**28,615**	**26,919**	**25,331**
Deaths						
Clients who died in the time period (number)	—	2,517	1,301	1,995	1,696	1,588
Deaths as per cent of all clients	—	7.3	3.8	5.8	4.9	4.6
Deaths as per cent of clients alive at previous time point	—	7.3	4.1	6.5	5.9	5.9

Note: Clients may use more than one program at a time, and so percentages do not sum to 100. Fewer than three clients were using Transition Care at the 24 month time point. This is not shown in the table.

Table 4.8: PIAC cohort: time to death after reference assessment, by PIAC group (per cent)

Time after completion of reference ACAT assessment	Continuing path	HACC and/or VHC before	No previous care	All new-pathways cohort	All	Total number
Q1: ≤ 91 days	9.5	8.2	7.4	7.8	8.3	8,658
Q2: 92-183 days	5.8	4.9	3.8	4.4	4.8	5,008
Q3: 184-274 days	4.6	3.9	3.1	3.5	3.8	3,997
Q4: 275-365 days	4.0	3.4	2.7	3.1	3.3	3,481
Within 1 year	*23.9*	*20.4*	*16.9*	*18.8*	*20.2*	*21,144*
Q5: 366-456 days	4.0	3.2	2.5	2.9	3.2	3,344
Q6: 457-548 days	3.8	3.0	2.4	2.7	3.0	3,134
Q7: 549-639 days	3.5	2.9	2.3	2.6	2.9	3,021
Q8: 640-730 days	3.6	2.9	2.3	2.7	2.9	3,039
Within 1 to 2 years	*14.9*	*12.0*	*9.5*	*10.9*	*12.0*	*12,538*
Within 2 years	*38.8*	*32.4*	*26.5*	*29.7*	*32.1*	*33,682*
No event	61.2	67.6	73.5	70.3	67.9	71,211
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**27,545**	**42,920**	**34,428**	**77,348**	**. .**	**104,893**

Notes

1. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
2. The reference date is the date of the end of the first completed ACAT assessment in 2003–04.

Appendix A: PIAC cohort characteristics

The characteristics of the PIAC cohort at the time of their first completed ACAT assessment in 2003–04 are discussed in detail below. Some characteristics, such as sex and cultural background, should remain unchanged over time; however, others (e.g. social circumstances and care needs) may change from assessment to assessment.

A.1 Summary

Analysis of the characteristics of the PIAC cohort groups suggests that people in the new-pathways cohort who had already accessed HACC or VHC before their reference assessment had higher care needs than those who had had no previous care, and so were further along their 'care needs pathway'. As expected, those in the continuing pathway group had the highest care needs. Several results point to this conclusion:

- Continuing path group members were, on average, older (83.3 years) than new-pathways cohort members who had accessed HACC or VHC services before their reference ACAT assessment (81.6 years). This latter group in turn tended to be older than those who had had no previous care (79.5 years).
- Among people living in the community at the time of their reference assessment, people who had already accessed ACAT-dependent services were less likely to be living alone (43%) than other cohort members. People who had not previously accessed aged care programs were the least likely to be living alone (37%).
- People who had not previously used ACAT-dependent, HACC or VHC programs were more likely than others to need a high priority assessment.
- On average between three and four health conditions were reported as contributing to the care needs of cohort members. The level of co-morbidity was least among cohort members who had not previously used care programs, with this group averaging 3.4 health conditions compared with 3.8 among other new-pathways members and 4.0 for those in the continuing path group.
- People in the continuing path group tended to require assistance with more activities of daily living (ADLs) and instrumental activities of daily living (IADLs) than others. In addition, new-pathways cohort members who had previously used HACC or VHC tended to have more care needs than those who had not, in particular with IADLs.
- Among new-pathways cohort members, those with no previous care were less likely to be recommended to live in permanent residential care than others, particularly for low-level care (20% versus 25%).
- Residential respite care was more often recommended for new-pathways cohort members who had previously used HACC or VHC than for those who had not (69% compared with 54%).
- Among people recommended to live in the community, 48% did not get approval to use any of the ACAT-dependent programs at their reference assessment. However, nearly two thirds of those without any approvals got recommendations for community care programs.

- Overall, nearly one quarter of those recommended to live in the community had no community care recommendations. This percentage was much higher among those who had not previously used any care programs: 33% compared with 10–17% for other cohort groups.
- Nearly 60% of the PIAC cohort received approval for at least one care program that required an ACAT assessment. Those with no previous use of care programs were the least likely to get at least one approval (52%). People continuing on their care pathway at the time of the reference assessment were most likely to get one or more approvals—64%, including 26% with an approval for high-level permanent residential care.

Other characteristics of interest include:

- The average age of the PIAC cohort was 81.4 years; 15% of the cohort were aged 90 or over at the reference ACAT assessment.
- Just 36% of the PIAC cohort were men. This varied the PIAC group: 31% of the continuing path cohort were men, compared with 34% of those with HACC or VHC only before the reference assessment, and 41% of those with no previous care.
- New-pathways cohort members who had used VHC had a different demographic profile from other cohort members as a consequence of the eligibility criteria for this program. They were more likely to be male (over 50% versus 36% for the full PIAC cohort), to be aged 80–89 years (70% versus 49%) and to be born in Australia (94% versus 68%), and less likely to be Aboriginal or a Torres Strait Islander (0.1% versus 1.0%).
- Almost 40% of the continuing path cohort were reported as already living in permanent residential care. In all PIAC groups, small proportions of ACAP clients were living in other institutions and supported accommodation.
- Among cohort members living in the community at the reference assessment, nearly 80% had a carer available. Carers were most commonly a spouse (35% of carers) or daughter (also 35%).
- Across the PIAC groups, between 20% and 23% of the cohort had their ACAT reference assessment in hospital.
- The most common health conditions affecting care needs were circulatory system diseases (60% of the cohort), mental disorders (40%, including 27% with dementia), musculoskeletal diseases (42%), and endocrine, nutritional and metabolic disorders (21%). The first three of these were also commonly identified by ACATs as the main health condition impacting on need for assistance (for 22%, 24% and 13% of the cohort, respectively).

A.2 Demographic characteristics

Regional coverage

Table A.1 shows the distribution of the PIAC cohort for the states and territories. The absence of Queenslanders and the relatively small number of cohort members from New South Wales reflect the incomplete coverage of ACAP NMDS v2 in 2003–04 (see Appendix B). Use of HACC and VHC prior to the reference ACAT assessment was more prevalent in some jurisdictions than others. In particular, cohort members from New South Wales and the Northern Territory were less likely than others to have used these services:

just under 60% of cohort members in these jurisdictions had accessed any care services prior to their reference ACAT assessment, compared with over 70% of clients in the other states and territories (Table A.1).

Sex and age

Reflecting the greater longevity of women than men, nearly two-thirds (64%) of the cohort were women (Table A.2). However, as expected, there were relatively more men among people who had used VHC prior to their reference assessment, and they constituted 60% of those who only used VHC services previously (and not HACC).

Overall, women were more likely than men to have previously accessed ACAT-dependent services (28% versus 23%). As a consequence of the differential access to VHC services, men were more likely to have used VHC services prior to accessing ACAP.

Not surprisingly, older clients were more likely than younger clients to have already used ACAT-dependent services at the start of the study period (Table A.3). Almost 22% of cohort members who had accessed ACAT-dependent services prior to their reference assessment were aged 90 or more compared with 11% of the cohort who had not accessed any care programs before their reference assessment. Furthermore, new-pathways cohort members who had accessed HACC or VHC services before their reference ACAT assessment tended to be older than those who had not (64% versus 56%for people aged 80+).

Overall, in the PIAC cohort women tended to be older than the men, again reflecting the greater longevity of women than men (Table A.4, Table A.5). However, among clients who had accessed VHC services before their reference ACAT assessment a larger proportion of women were aged under 80 than men. This is explained by the tendency for men (that is, in this case usually the veteran) to marry women younger than themselves.

Overall, it is estimated that 15% of the PIAC cohort had either a gold or white DVA card. Relatively few people with VHC gold cards had accessed only HACC services prior to their reference assessment, and, as expected, few people reported as having no DVA entitlement were identified as new-pathways cohort members who had used VHC prior to their assessment (Table A.6). While the majority of new-pathways people accessing VHC services were reported as having a DVA entitlement, 12% were not. This, in conjunction with the high rate of missing values, suggests that this data may not be very reliable.

Cultural diversity

Indigenous people made up less than 2% of the PIAC cohort (Table A.7). In general, a smaller proportion of Indigenous people had accessed either HACC or VHC before their reference assessment (31% versus 41% for non-indigenous people). In particular, very few Indigenous people had used VHC services (only 14 PIAC cohort members).

The English Proficiency (EP) Groups classification is used to indicate a migrant's level of English proficiency (Box A.1). People born in Australia and in EP1 countries had similar profiles in terms of previous use of ACAT-dependent programs and other community care (Table A.8). For the other EP groups, decreasing English proficiency was associated with decreasing levels of previous use of care programs: 54% of EP4 cohort members had no previous use of care programs compared with around 30% of those born in Australia or EP1 countries. Analysis by country of birth shows similar results (Table A.9). As expected, only a

small proportion of people who used VHC services prior to their reference assessment had been born overseas.

Box A.1: English Proficiency groups

The English Proficiency (EP) Groups classification is used to indicate a migrant's level of English proficiency using an English proficiency index, the person's country of birth and the number of that country's immigrants living in Australia (DIMA 2003). The EP index is defined as the percentage of recent immigrants (those entering in the 5 years before the Census) who speak English only or another language and good English. Good English is defined as those who reported at the Census that they spoke 'English Only' or spoke English 'Very Well' or 'Well'. The 2001 English proficiency groups are defined such that:

EP1 = All countries rating 98.5% or higher with at least 10,000 residents in Australia

EP2 = Countries rating 84.5% or higher on the EP index, other than those in EP1

EP3 = Countries rating 57.5% to less than 84.5%

EP4 = Countries rating less than 57.5%.

Source: DIMA 2003.

Table A.1: PIAC cohort: state/territory of client usual residence, by PIAC group

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
			Row per cent				%	N
NSW	25.1	28.0	2.1	2.3	32.3	42.5	100.0	32,017
Vic	26.6	39.0	2.3	3.2	44.5	29.0	100.0	41,603
WA	28.0	36.6	2.8	2.8	42.1	29.9	100.0	12,533
SA	25.9	41.8	2.2	2.7	46.8	27.2	100.0	12,054
Tas	27.7	40.9	4.3	4.0	49.2	23.1	100.0	3,953
ACT	25.7	41.8	2.9	3.7	48.3	26.0	100.0	2,033
NT	28.4	29.3	0.7	0.9	30.9	40.7	100.0	700
Total	**26.3**	**35.8**	**2.4**	**2.8**	**40.9**	**32.8**	**100.0**	**. .**
Total (number)	**27,545**	**37,502**	**2,466**	**2,952**	**42,920**	**34,428**	**. .**	**104,893**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference date is date of referral to ACAP for first completed ACAT assessment in 2003–04.
2. Implementation of the ACAP NMDS v2 was done on a regional basis, and full implementation was not achieved until October 2005 when Queensland moved to this version of the NMDS. Seventy per cent of all ACAT assessments carried out in 2003–04 were reported using NMDS v2, with all of Queensland and parts of New South Wales being reported using the earlier version (v1) of the NMDS v2 (ACAP NDR 2005).
3. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8)
4. Components may not add to total due to rounding.

Table A.2: PIAC cohort: sex by PIAC group

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
			Row per cent				%	N
Male	22.9	31.5	4.0	4.0	39.4	37.6	100.0	37,503
Female	28.1	38.1	1.5	2.2	41.8	30.1	100.0	67,367
Total	**26.3**	**35.8**	**2.4**	**2.8**	**40.9**	**32.8**	**100.0**	**104,870**
			Column per cent					
Male	31.2	31.5	60.1	50.8	34.5	41.0	35.8	37,502
Female	68.8	68.5	39.9	49.2	65.5	59.0	64.2	67,368
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**27,543**	**37,495**	**2,466**	**2,951**	**42,912**	**34,415**	**. .**	**104,870**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 23 cases with missing sex.
3. Components may not add to total due to rounding.

Table A.3: PIAC cohort: client age, by PIAC group

Age group at date of referral to ACAP	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
				Row per cent			%	N
0–49	12.5	31.4	0.1	-	31.5	56.0	100.0	1,052
50–64	19.4	36.5	0.2	0.2	36.9	43.8	100.0	4,641
65–79	21.2	36.8	1.5	1.7	40.1	38.7	100.0	32,682
80–84	23.7	35.3	3.9	4.3	43.5	32.8	100.0	27,193
85–89	30.0	36.3	2.8	3.6	42.6	27.3	100.0	23,980
90+	38.6	33.6	1.6	2.2	37.4	24.0	100.0	15,334
Total	**26.3**	**35.8**	**2.4**	**2.8**	**40.9**	**32.8**	**100.0**	**104,882**
				Column per cent				
0–49	0.5	0.9	0.0	—	0.8	1.7	1.0	1,052
50–64	3.3	4.5	0.4	0.3	4.0	5.9	4.4	4,641
65–79	25.2	32.1	19.9	19.2	30.5	36.7	31.2	32,682
80–84	23.4	25.6	43.2	39.6	27.6	25.9	25.9	27,193
85–89	26.1	23.2	26.8	29.4	23.8	19.0	22.9	23,980
90+	21.5	13.7	9.7	11.6	13.4	10.7	14.6	15,334
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**27,543**	**37,501**	**2,466**	**2,952**	**42,919**	**34,420**	**. .**	**104,882**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference date is date of referral to ACAP for first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 11 cases with missing age.
3. Components may not add to total due to rounding.

Table A.4: PIAC cohort: client sex and age, by PIAC group (per cent)

Sex by PIAC group	Age at referral date							
	0–49	50–64	65–79	80–84	85–89	90+	Total	Number
Male								
Continuing path	0.7	5.4	33.3	22.8	22.5	15.3	100.0	8,600
HACC only before	1.4	6.5	38.1	23.0	19.8	11.3	100.0	11,803
VHC only before	—	0.4	17.5	46.8	26.3	9.0	100.0	1,482
HACC and VHC before	—	0.3	15.1	43.5	31.0	10.1	100.0	1,500
HACC/VHC subtotal	*1.1*	*5.3*	*33.7*	*27.4*	*21.6*	*11.0*	*100.0*	*14,785*
No HACC or VHC before	2.4	8.0	40.2	24.0	16.8	8.6	100.0	14,111
Total	**1.5**	**6.3**	**36.1**	**25.1**	**20.0**	**11.1**	**100.0**	**37,496**
Female								
Continuing path	0.4	2.3	21.5	23.7	27.8	24.3	100.0	18,941
HACC only before	0.6	3.6	29.3	26.8	24.8	14.9	100.0	25,691
VHC only before	0.1	0.3	23.6	37.9	27.4	10.7	100.0	984
HACC and VHC before	—	0.3	23.4	35.5	27.8	13.0	100.0	1,451
HACC/VHC subtotal	*0.6*	*3.3*	*28.8*	*27.6*	*25.0*	*14.6*	*100.0*	*28,126*
No HACC or VHC before	1.2	4.4	34.3	27.2	20.6	12.2	100.0	20,296
Total	**0.7**	**3.4**	**28.4**	**26.4**	**24.5**	**16.6**	**100.0**	**67,363**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 34 cases with missing age and/or sex.
3. Components may not add to total due to rounding.

Table A.5: PIAC cohort: mean and median age, by sex and PIAC group (years)

Sex	Continuing path	HACC and/or VHC before				No previous care	Total
		HACC only	VHC only	HACC and VHC	Subtotal		
				Mean			
Male	81.11	79.56	83.71	84.13	80.44	78.00	79.68
Female	84.32	82.01	83.57	83.82	82.15	80.61	82.30
Total	**83.32**	**81.24**	**83.65**	**83.97**	**81.56**	**79.54**	**81.36**
				Median			
Male	82.46	80.98	83.28	83.78	81.89	79.86	81.26
Female	85.40	83.12	83.39	83.62	83.16	81.90	83.34
Total	**84.49**	**82.53**	**83.33**	**83.70**	**82.73**	**81.11**	**82.64**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference date is date of referral to ACAP for first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 34 cases with missing age and/or sex.

Table A.6: PIAC cohort: DVA entitlement status, by PIAC group (per cent)

	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
				Row per cent			**%**	**N**
DVA gold card	24.8	17.5	14.2	17.1	48.8	26.4	100.0	11,806
DVA white card	25.6	37.2	2.5	5.1	44.8	29.6	100.0	1,033
DVA no card	27.7	25.7	5.1	5.1	35.9	36.5	100.0	4,038
No DVA entitlement	25.7	39.9	0.4	0.4	40.8	33.5	100.0	68,145
Total	**25.7**	**36.1**	**2.6**	**3.0**	**41.7**	**32.6**	**100.0**	**85,022**
				Column per cent				
DVA gold card	13.4	6.7	77.0	78.2	16.2	11.3	13.9	11,806
DVA white card	1.2	1.3	1.2	2.1	1.3	1.1	1.2	1,033
DVA no card	5.1	3.4	9.5	7.9	4.1	5.3	4.7	4,038
No DVA entitlement	80.3	88.6	12.3	11.9	78.4	82.3	80.1	68,145
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100**	**. .**
Total (number)	**21,823**	**30,712**	**2,174**	**2,582**	**35,468**	**27,731**	**. .**	**85,022**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 19,871 cases (18.9% of the cohort) with missing DVA entitlement status.
3. Components may not add to total due to rounding.

Table A.7: PIAC cohort: Indigenous status by PIAC group (per cent)

Indigenous status as reported at the reference assessment	Cont'ing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
				Row per cent			%	N
Aboriginal	29.2	30.9	0.2	0.3	31.3	39.4	100.0	1,047
Torres Strait Islander	9.6	26.9	—	—	26.9	63.5	100.0	52
Both Aboriginal and Torres Strait Islander	11.2	26.1	3.7	3.0	32.8	56.0	100.0	134
Subtotal	*26.4*	*30.2*	*0.6*	*0.6*	*31.3*	*42.3*	*100.0*	*1,233*
Non-Indigenous	26.7	36.0	2.4	2.9	41.3	32.0	100.0	99,492
Total	**26.7**	**36.0**	**2.4**	**2.9**	**41.2**	**32.1**	**100.0**	**100,725**
				Column per cent				
Aboriginal	1.1	0.9	0.1	0.1	0.8	1.3	1.0	1,047
Torres Strait Islander	0.0	0.0	—	—	0.0	0.1	0.1	52
Both Aboriginal and Torres Strait Islander	0.1	0.1	0.2	0.1	0.1	0.2	0.1	134
Subtotal	*1.2*	*1.0*	*0.3*	*0.2*	*0.9*	*1.6*	*1.2*	*1,233*
Non-Indigenous	98.8	99.0	99.7	99.8	99.1	98.4	98.8	99,492
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**26,916**	**36,226**	**2,370**	**2,871**	**41,467**	**32,342**	**. .**	**100,725**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 4,169 cases (4.0% of cohort) with missing Indigenous status.
3. Components may not add to total due to rounding.

Table A.8: PIAC cohort: English proficiency group by PIAC group (per cent)

EP group as derived from country of birth reported at the reference assessment	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
				Row per cent			%	N
Born in Australia	27.0	35.4	3.1	3.8	42.3	30.7	100.0	71,838
EP1	28.8	39.1	1.0	1.2	41.2	30.0	100.0	11,383
EP2	25.4	37.5	0.1	0.3	37.8	36.8	100.0	5,881
EP3	22.9	35.6	0.1	0.1	35.8	41.3	100.0	11,099
EP4	16.2	29.2	0.2	0.2	29.6	54.2	100.0	493
Total	**26.6**	**35.9**	**2.3**	**2.8**	**41.1**	**32.3**	**100.0**	**100,694**
				Column per cent				
Born in Australia	72.4	70.3	94.6	94.4	73.4	67.9	71.3	71,838
EP1	12.2	12.3	4.7	4.6	11.3	10.5	11.3	11,383
EP2	5.6	6.1	0.3	0.6	5.4	6.7	5.8	5,881
EP3	9.5	10.9	0.4	0.4	9.6	14.1	11.0	11,099
EP4	0.3	0.4	0.0	0.0	0.4	0.8	0.5	493
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**26,787**	**36,199**	**2,360**	**2,861**	**41,420**	**32,487**	**. .**	**100,693**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. See Box A.1 for definition of the English Proficiency (EP) Groups classification.
3. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 4,200 cases (4.0% of cohort) with missing EP group.
4. Components may not add to total due to rounding.

Table A.9: PIAC cohort: country of birth by PIAC group (per cent)

Country of birth reported at the reference assessment	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
				Row per cent			%	N
Australia	27.0	35.4	3.1	3.8	42.3	30.7	100.0	71,865
New Zealand	25.7	33.7	0.9	1.2	35.8	38.5	100.0	561
Other Oceania	20.4	26.7	0.8	2.1	29.6	50.0	100.0	240
United Kingdom/Ireland	29.1	39.5	1.0	1.2	41.6	29.3	100.0	10,297
Europe	24.0	37.6	0.1	0.1	37.8	38.3	100.0	13,086
Asia	22.9	31.4	0.1	0.3	31.8	45.4	100.0	2,708
Other	22.6	34.0	0.1	0.3	34.3	43.1	100.0	1,937
Total	**26.6**	**35.9**	**2.3**	**2.8**	**41.1**	**32.3**	**100.0**	**100,694**
				Column per cent				
Australia	72.5	70.3	94.7	94.5	73.4	67.9	71.4	71,865
New Zealand	0.5	0.5	0.2	0.2	0.5	0.7	0.6	561
Other Oceania	0.2	0.2	0.1	0.2	0.2	0.4	0.2	240
United Kingdom/Ireland	11.2	11.2	4.4	4.2	10.4	9.3	10.2	10,297
Europe	11.7	13.6	0.4	0.5	11.9	15.4	13.0	13,086
Asia	2.3	2.3	0.1	0.3	2.1	3.8	2.7	2,708
Other	1.6	1.8	0.1	0.2	1.6	2.6	1.9	1,937
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**26,787**	**36,199**	**2,360**	**2,861**	**41,420**	**32,487**	**. .**	**100,694**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 4,200 cases (4.0% of cohort) with missing country of birth.
3. Components may not add to total due to rounding.

A.3 Living arrangements

Usual accommodation

Almost 40% of people who had used ACAT-dependent programs prior to their first ACAT assessment in 2003–04 were reported as already living in permanent residential care (Table A.10). The majority of these assessments were because all permanent aged care residents up until 30 June 2004 required an ACAT assessment to change from low- to high-care—not just those who were changing care facilities as was the case from 1 July 2004 (AIHW 2005).

As would be expected from their definition, the majority of new-pathways clients were living in their own home at the time of their reference assessment. However, VHC users

were more likely than other new-pathways cohort members to be living in a home they owned (75% compared with 69% among those with no previous use of care services), and so were less likely to be renting, either privately or publicly. They were also more likely to be living independently in a retirement village (over 10% among those using VHC compared with 7% among those who had only accessed HACC or no other care prior to their assessment).

In all PIAC groups, small proportions of ACAP clients were living in other institutions and supported accommodation. However, small proportions of new-pathways PIAC cohort members were also reported as usually living in RAC. This discrepancy is a consequence of three factors:

- use of unfunded places in Commonwealth-funded RAC facilities
- inaccurate reporting of usual residence—estimated at about 1% for those with usual residence reported as a RAC facility
- misidentification of new-pathways clients due to missed links between ACAP and ACCMIS data sets.

Estimates of the prevalence of unfunded places (see Appendix B) suggest that the first two reasons are likely to be the main causes of this apparent inconsistency.

Carers

Among people living in the community at the time of their reference assessment, people who had accessed HACC or VHC services before this assessment were more likely to be living alone than others: 51% of those who had used HACC or VHC services compared with 37% of those with no previous care lived alone (Table A.11). Those who had already accessed ACAT-dependent programs were slightly more likely than others to have a carer (82% compared with 74%–78%) (Table A.12). Note, however, that there is a high rate of missing data for information on carers.

Nearly 60% of carers were co-resident (Table A.13). However, within PIAC groups this percentage ranged from 46% of carers among those who had used both HACC and VHC services before the reference ACAT assessment to 66% co-resident in the continuing path group.

Overall, children of the cohort member accounted for half of the carers, with a further 35% being the spouse of the ACAP client (Table A.14). Reflecting the VHC client base, new-pathways cohort members who had only used VHC before their reference ACAT assessment had the highest proportion of carers who were wives (41% compared with 21% across the cohort) and very few who were husbands (2% compared with 14%). Interestingly, carers of VHC clients who had also accessed HACC services were more commonly offspring than those for people who had only accessed VHC (57% versus 48%). Since VHC provides only a limited number of services, this may indicate that these clients were using HACC services to meet care needs that were being provided for by the wife-carer in the 'VHC only' group.

Table A.10: PIAC cohort: usual accommodation at reference assessment by PIAC group (per cent)

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
			Per cent				%	N
Private residence: owned/purchasing	41.3	70.4	75.8	75.1	71.0	68.7	62.4	62,869
Private residence: private rental	3.6	6.5	4.8	5.9	6.3	6.4	5.6	5,666
Private residence: public rental or community housing	5.3	8.9	3.4	5.0	8.3	7.3	7.2	7,247
Independent living within a retirement village	4.6	7.4	11.8	9.9	7.9	7.1	6.8	6,803
Boarding house/rooming house/private hotel	0.4	0.3	0.1	0.1	0.3	0.6	0.4	409
Short-term crisis, emergency, or transitional accommodation	0.1	0.1	—	0.0	0.1	0.2	0.1	141
Supported community accommodation	0.8	1.7	0.8	0.9	1.6	2.2	1.6	1,619
RAC: low level care	36.2	0.4	0.2	0.2	0.4	1.3	10.1	10,183
RAC: high level care	3.1	0.1	—	0.1	0.1	0.3	0.9	951
Hospital	0.3	0.2	0.2	0.1	0.2	0.4	0.3	271
Other institutional care	0.6	0.2	0.1	0.1	0.2	0.4	0.4	357
Public place/temporary shelter	0.1	0.1	0.1	0.1	0.1	0.2	0.1	123
Other	3.7	3.8	2.7	2.4	3.6	4.9	4.0	4,074
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**26,523**	**35,982**	**2,377**	**2,836**	**41,195**	**32,995**	**. .**	**100,713**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 4,179 cases (4.0% of cohort) with missing usual accommodation.
3. Components may not add to total due to rounding.

Table A.11: PIAC cohort living in the community: living arrangement at reference assessment by PIAC group (per cent)

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
			Per cent				%	N
Lives alone	43.1	50.0	48.2	58.0	50.5	37.1	44.3	38,333
Lives with family	52.9	47.6	50.2	40.3	47.2	59.1	52.5	45,396
Lives with others	4.0	2.4	1.6	1.7	2.3	3.8	3.1	2,707
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**15,178**	**34,863**	**2,319**	**2,770**	**39,952**	**31,306**	**. .**	**86,436**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 6,695 cases (6.4% of cohort) with missing living arrangement.
3. Not applicable cases: 11,762 (11.2%) recorded for people living permanently in RAC, hospitals and other institutional care, and multipurpose services).
4. Components may not add to total due to rounding.

Table A.12: PIAC cohort living in the community: carer availability at reference assessment by PIAC group (per cent)

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
			Per cent				%	N
Carer available	82.4	77.7	77.5	74.7	77.5	78.2	78.6	65,611
Carer not available	17.6	22.3	22.5	25.3	22.5	21.8	21.4	17,868
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**14,661**	**33,884**	**2,265**	**2,699**	**38,848**	**29,970**	**. .**	**83,479**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 9,650 cases (9.2% of cohort) with missing carer availability.
3. Not applicable cases: 11,763 (11.2%, recorded for people living permanently in RAC, hospitals and other institutional care, and multipurpose services).
4. Components may not add to total due to rounding.

Table A.13: PIAC cohort living in the community with a carer: carer co-residency at reference assessment by PIAC group (per cent)

	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
		Per cent					%	N
Co-resident	60.5	53.4	56.2	45.8	53.0	65.5	58.9	38,357
Non-resident	39.5	46.6	43.8	54.2	47.0	34.5	41.1	26,803
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**11,998**	**26,165**	**1,749**	**2,004**	**29,918**	**23,244**	**. .**	**65,160**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 10,089 cases (9.6% of cohort) with missing carer residency.
3. Not applicable cases: 29,644 (28.3%, recorded for people living permanently in RAC, hospitals and other institutional care, and multipurpose services or for those living in the community without a carer).
4. Components may not add to total due to rounding.

Table A.14: PIAC cohort living in the community with a carer: carer relationship at reference assessment by PIAC group (per cent)

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
			Per cent				%	N
Wife	19.2	17.3	41.3	29.4	19.5	24.0	21.1	12,068
Husband	12.1	14.9	1.6	1.4	13.3	15.9	14.0	8,025
Mother	0.6	0.6	—	0.1	0.5	0.6	0.6	323
Father	0.1	0.1	—	—	0.1	0.2	0.2	87
Daughter	38.2	35.9	33.1	37.4	35.8	31.2	34.6	19,785
Son	15.9	16.5	14.5	19.1	16.5	14.5	15.7	8,963
Daughter-in-law	2.3	2.4	1.5	2.1	2.3	2.3	2.3	1,306
Son-in-law	0.3	0.2	0.2	0.5	0.2	0.2	0.2	126
Other female relative	5.9	5.8	3.6	4.9	5.6	5.1	5.5	3,129
Other male relative	1.7	2.0	0.8	1.2	1.9	1.8	1.8	1,032
Friend/neighbour female	2.5	3.0	2.3	2.4	3.0	2.6	2.7	1,572
Friend/neighbour male	0.8	1.0	0.8	1.0	1.0	1.1	1.0	564
Private employee	0.6	0.3	0.4	0.3	0.3	0.6	0.5	268
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**10,443**	**22,676**	**1,559**	**1,661**	**25,896**	**20,909**	**. .**	**57,248**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 18,002 cases (17.2% of cohort) with missing carer relationship.
3. Not applicable cases: 29,644 (28.3%, recorded for people living permanently in RAC, hospitals and other institutional care, and multipurpose services or for those living in the community without a carer).
4. Components may not add to total due to rounding.

A.4 Assessment priority and location

Overall, for 12% of the cohort the reference assessment was of the highest priority, requiring clinical contact by the ACAT within 48 hours (Table A.15). People who had had no previous use of care programs were slightly more likely to be given high priority than others (14%). In all PIAC groups, around 60% were assessed as requiring clinical contact by an ACAT within 14 days.

There was little variation by PIAC group in the proportion of assessments that occurred in hospital, ranging from 21% among those who had already accessed ACAT-dependent programs to 23% among cohort members with no previous use of care services (Table A.16). For new-pathways cohort members, around 70% of assessments were carried out in 'other' settings (predominantly their home in the community). For those continuing their care pathway, almost one-third (32%) of assessments were carried out in a RAC facility and two-fifths (43%) were done at the person's home in the community.

Table A.15: PIAC cohort: priority of reference assessment by PIAC group (per cent)

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
Within 48 hours	11.8	10.6	10.2	10.2	10.6	13.5	11.9	12,091
Between 3 and 14 days	50.7	48.1	48.0	49.8	48.2	46.7	48.4	49,300
More than 14 days	37.5	41.3	41.8	39.9	41.2	39.7	39.7	40,484
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**26,862**	**36,628**	**2,418**	**2,909**	**41,955**	**33,058**	**. .**	**101,875**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 3,018 cases (2.9% of cohort) with missing assessment priority.
3. Components may not add to total due to rounding.

Table A.16: PIAC cohort: location of first face-to-face contact for the reference assessment by PIAC group (per cent)

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
Hospital	20.5	21.3	21.5	22.5	21.4	23.0	21.7	22,546
Other inpatient setting	4.2	5.4	5.2	5.4	5.4	5.5	5.1	5,319
Residential aged care service	31.9	1.6	1.8	1.8	1.6	2.2	9.7	10,134
Other	43.4	71.7	71.5	70.2	71.6	69.3	63.4	65,954
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**27,266**	**37,226**	**2,452**	**2,930**	**42,608**	**34,079**	**. .**	**103,953**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 940 cases (0.9% of cohort) with missing location of first face-to-face contact with ACAT.
3. Components may not add to total due to rounding.

A.5 Health and care needs at time of assessment

Health conditions

ACATs identified mental and behavioural disorders as the main health condition impacting on need for assistance for nearly one-quarter (24%) of the PIAC cohort (Table A.17). Dementia was reported as the main condition for 80% of these clients (19% of the cohort). Other conditions commonly reported as the main health condition were circulatory diseases (22% in total) and musculoskeletal diseases (13%). Other conditions reported for at least 5% of the cohort included diseases of the nervous system and of the respiratory system (both 6%), cancers and tumours (5%), and injuries (5%).

While the distribution of main health condition looks similar across the various PIAC groups, there are some significant differences:

- People who had previously used ACAT-dependent services prior to their reference assessment were more likely than others to have dementia identified as the main health condition: 28% compared with less than 19% for the other groups.
- Heart disease appeared to be a greater cause for increased care needs among veterans than non-veterans. This was identified as the main health condition for 13% of the group who had only used VHC services before their reference ACAT assessment, compared with 10% of those who had only used HACC services before and 8% of the 'Continuing path' group. A similar pattern is seen for diseases of the respiratory system (identified for 9% of the people who had previously used VHC services compared with 6% or less for the other groups).
- Musculoskeletal conditions were most common as the main health condition among people who had only used HACC services prior to their 2003–04 assessment (15%), and least common among those continuing on their pathway (11%).
- At 3%, cancers and tumours were least likely to be the main condition impacting on the need for assistance among those already accessing ACAT-dependent programs. Over 5% of other groups had these conditions identified as the main health condition.

The total prevalence of health conditions that were impacting on need for assistance is given in Table A.18. The high proportions for several conditions shows that there are substantial levels of co-morbidity in the cohort, and on average between three and four conditions were reported as contributing to the care needs of cohort members. The level of co-morbidity was lowest among cohort members who had not previously used care programs, with this group averaging 3.4 health conditions compared with 3.7 across the entire PIAC cohort.

The most common conditions affecting care needs were:

- circulatory system diseases (60%)
- mental disorders, affecting 40% of the cohort (27% with dementia)
- musculoskeletal diseases (42%)
- endocrine, nutritional and metabolic disorders, present for 21% of the cohort compared with 4% with this reported as the main condition.

Nearly one-quarter of the cohort (24%) were reported as having 'Symptoms, signs and abnormal findings not elsewhere classified' that affected their need for assistance. This suggests that a sizeable minority of cohort members had unidentified health conditions that were affecting their need for assistance.

A number of conditions were fairly common but were unlikely to be the prime reason for the assessment. For example, ear diseases were rarely reported as the main condition (under 1%), but were affecting care needs for 9% of the cohort.

As with main health condition, there are some differences between the PIAC groups in the health conditions overall affecting care needs:

- Those continuing on their care pathway at the time of the reference assessment had the lowest prevalence of cancers and tumours (10%), and those in the 'VHC only' group had the highest (17%). The low rate among the 'Continuing path' group may result from the relatively short life expectancy of people in residential care with cancer (AIHW: Karmel et al. 2008).

- As for main condition, heart disease and respiratory system problems were more common among the 'VHC only' new-pathways group than other pathway groups.
- Musculoskeletal conditions were least common, but still highly prevalent, among new-pathways cohort members who had not previously accessed community care—37% compared with over 44% for other PIAC groups.
- Reflecting to some extent their older age profile, people continuing their care pathway had higher rates of both dementia and other mental disorders: 38% had dementia reported and 21% had other mental disorders compared with 26% and 16% for the group with the next highest rates (people who had not used any care programs prior to their reference assessment).

Care needs

Care needs with five activities of daily living (ADLs)—self care, movement activities (such as changing position or manipulating objects), moving around places, communication and health care tasks—are considered during the assessment process. As expected, people already on their care pathway tended to require assistance with more of these activities than others (Table A.19). Just over two-fifths of this group (41%) had four or more activities requiring assistance compared with 20% for those who had not previously used care services. On average those continuing their path needed assistance with 3.0 ADLs compared with 2.0 or fewer for people in the other groups.

Information on five instrumental activities of daily living (IADLs)—transport, social participation activities, domestic assistance, meals and home maintenance—are also reported on the ACAP NMDS for people usually living in the community at the time of assessment. As for ADLs, people who had not previously accessed care services had fewer IADL needs than others: 16% of the 'No previous care' group had under four IADL care needs and an average IADL score of 3.4 compared with under 10% for the other PIAC groups and average scores of 3.7 or more (Table A.20).

As part of the ACAT assessment, people are asked about their source of assistance for ADL and IADL care needs. Sources are categorised into formal (assistance provided through government programs, not-for-profit agencies and private for-profit agencies) and informal (family and friends). As expected, people who had not used either HACC, VHC or ACAT-dependent services before their reference assessment were less likely than others to be getting formal assistance with ADL care needs at the time of assessment (22% compared with over 40%) (Table A.21). This group was also more likely to be getting help only from informal sources, with 37% getting assistance only from family and friends compared with 27% of people who had previously accessed HACC and/or VHC services, and 21% who had accessed ACAT-dependent programs. Similar patterns were seen for assistance with IADLs (Table A.22).

Table A.17: PIAC cohort: main health condition impacting on need for assistance by PIAC group

Main health condition group	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
			Per cent				%	N
1 Infectious and parasitic diseases	0.1	0.2	0.1	0.2	0.2	0.2	0.2	194
2 Neoplasms (cancers and tumours)	3.0	5.4	6.4	6.4	5.5	6.1	5.0	5,157
3 Blood, blood-forming organs and immunological disorders	0.5	0.6	0.8	0.5	0.6	0.5	0.5	525
4 Endocrine, nutritional and metabolic diseases	3.8	4.8	3.5	4.3	4.7	3.9	4.2	4,278
5a Mental/behavioural disorders – dementia	27.6	15.0	15.2	13.6	14.9	18.4	19.4	19,793
5b Mental/behavioural disorders – other	5.0	4.5	3.4	2.7	4.3	5.3	4.8	4,900
5 Mental/behavioural disorders	*32.6*	*19.4*	*18.6*	*16.3*	*19.2*	*23.7*	*24.2*	*24,693*
6 Nervous system	6.5	6.6	5.8	5.8	6.5	5.5	6.2	6,311
7 Eye and adnexa	3.0	3.5	2.6	3.9	3.4	2.7	3.1	3,163
8 Ear and mastoid process	0.6	0.8	0.7	0.5	0.8	0.8	0.7	732
9a Circulatory system – heart disease	7.8	9.7	13.0	11.5	10.0	9.0	9.1	9,283
9b Circulatory system – cerebrovascular	9.2	7.4	7.9	7.5	7.5	9.0	8.4	8,598
9c Circulatory system – other	3.7	5.1	4.3	5.5	5.1	5.5	4.9	4,967
9 Circulatory system	*20.8*	*22.2*	*25.2*	*24.4*	*22.5*	*23.4*	*22.4*	*22,848*
10 Respiratory system	4.8	6.2	8.9	8.6	6.5	5.2	5.6	5,768
11 Digestive system	0.9	1.3	1.3	1.3	1.3	1.4	1.2	1,235
12 Skin and subcutaneous tissue	0.4	0.6	0.5	0.2	0.6	0.6	0.6	563
13 Musculoskeletal system and connective tissue	11.3	15.1	12.8	14.1	14.9	12.6	13.2	13,472
14 Genitourinary system	1.4	1.6	1.9	2.1	1.7	1.7	1.6	1,648
15 Congenital malformations	0.1	0.1	0.0	—	0.1	0.2	0.1	120
16 Injury, poisoning and other consequences of external causes	4.9	5.2	5.0	4.9	5.1	5.2	5.1	5,220
17 Symptoms, signs and abnormal findings n.e.c.	4.8	5.9	5.3	6.1	5.9	5.7	5.5	5,661
18 Other n.e.s.	0.5	0.6	0.5	0.4	0.6	0.5	0.5	543
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**26,880**	**36,625**	**2,423**	**2,918**	**41,966**	**33,285**	**. .**	**102,131**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 2,762 cases (2.5% of cohort) with no reported health conditions affecting care needs.
3. Components may not add to total due to rounding.

Table A.18: PIAC cohort: health conditions impacting on need for assistance within PIAC group (prevalence, as per cent)

Health condition group	Continuing path	HACC and/or VHC before: HACC only	HACC and/or VHC before: VHC only	HACC and/or VHC before: HACC and VHC	HACC and/or VHC before: Subtotal	No previous care	Total	
			Per cent				%	N
1 Infectious and parasitic diseases	0.6	0.7	0.7	0.9	0.7	0.6	0.6	640
2 Neoplasms (cancers and tumours)	10.0	12.0	16.7	15.4	12.5	12.2	11.7	11,969
3 Blood, blood-forming organs and immunological disorders	3.8	3.9	4.4	3.8	3.9	3.4	3.7	3,803
4 Endocrine, nutritional and metabolic diseases	21.3	22.5	20.1	21.2	22.2	19.6	21.1	21,595
5a Mental/behavioural disorders – dementia	38.1	21.6	22.1	20.4	21.5	25.5	27.2	27,764
5b Mental/behavioural disorders – other	20.6	16.1	13.6	12.7	15.7	15.8	17.0	17,400
5 Mental/behavioural disorders	*51.6*	*34.3*	*32.4*	*30.4*	*33.9*	*37.4*	*39.7*	*40,563*
6 Nervous system	14.6	13.1	13.0	12.9	13.1	11.3	12.9	13,196
7 Eye and adnexa	19.1	17.5	15.9	18.0	17.4	14.2	16.8	17,150
8 Ear and mastoid process	9.9	9.1	10.3	9.7	9.2	8.2	9.0	9,223
9a Circulatory system – heart disease	32.8	32.2	41.3	38.2	33.2	28.1	31.4	32,070
9b Circulatory system – cerebrovascular	18.4	14.6	16.1	16.9	14.9	15.0	15.8	16,182
9c Circulatory system – other	34.5	35.3	35.2	35.4	35.3	33.5	34.5	35,235
9 Circulatory system	*61.6*	*60.0*	*65.7*	*65.6*	*60.7*	*56.6*	*59.6*	*60,892*
10 Respiratory system	15.1	16.4	21.8	20.4	17.0	13.7	15.4	15,757
11 Digestive system	12.3	12.5	14.5	13.0	12.7	11.1	12.1	12,319
12 Skin and subcutaneous tissue	3.2	3.4	4.0	3.2	3.5	2.7	3.1	3,205
13 Musculoskeletal system and connective tissue	44.2	44.7	45.2	47.3	44.9	37.3	42.2	43,132
14 Genitourinary system	12.9	11.4	11.9	13.7	11.6	10.4	11.5	11,795
15 Congenital malformations	0.2	0.2	0.2	0.0	0.2	0.3	0.2	227
16 Injury, poisoning and other consequences of external causes	13.1	12.6	13.1	12.2	12.6	11.2	12.3	12,537
17 Symptoms, signs and abnormal findings n.e.c.	24.4	24.5	22.2	25.1	24.4	21.9	23.6	24,118
18 Other n.e.s.	3.1	3.3	3.8	3.1	3.3	2.7	3.0	3,110
Mean number of reported health conditions (number)	**3.99**	**3.74**	**3.96**	**3.91**	**3.77**	**3.37**	**3.70**	**. .**
All	**26,880**	**36,625**	**2,423**	**2,918**	**41,966**	**33,285**	**. .**	**102,131**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. People may have more than one health condition reported relating to the same health condition group. Only one health condition was reported by Australian Capital Territory ACATs (see Section A.1).
3. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 2,762 cases (2.5% of cohort) with no reported health conditions affecting care needs.

Table A.19: PIAC cohort: ADL score at reference assessment by PIAC group (per cent)

ADL score (max=5)	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
		Per cent					%	N
0	6.3	18.7	22.0	18.6	18.9	23.8	17.2	16,993
1	11.8	22.2	23.2	22.7	22.3	22.2	19.5	19,281
2	19.0	21.9	22.1	23.5	22.0	18.9	20.2	19,955
3	21.5	16.6	15.9	17.8	16.7	14.6	17.3	17,045
4	25.8	14.0	12.0	12.9	13.9	12.9	16.7	16,475
5	15.6	6.6	4.8	4.6	6.3	7.5	9.1	9,020
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	. .
Total (number)	**25,777**	**35,529**	**2,345**	**2,811**	**40,685**	**32,307**	**. .**	**98,769**
Mean score	**3.0**	**2.0**	**1.9**	**2.0**	**2.0**	**1.9**	**2.2**	**. .**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. ADLs include self care, movement activities, moving around places, communication and health care tasks.
3. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 6,123 cases (5.8% of cohort) with missing ADL data.
4. Components may not add to total due to rounding.

Table A.20: PIAC cohort living in the community: IADL score at reference assessment by PIAC group (per cent)

IADL score (max=5)	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
		Per cent					%	N
0	3.0	3.8	3.2	2.9	3.7	9.1	5.5	4,852
1	2.4	4.9	5.7	4.4	4.9	6.6	5.1	4,465
2	7.4	10.1	11.0	9.2	10.1	11.7	10.2	8,952
3	12.1	15.3	17.1	16.0	15.4	15.2	14.7	12,976
4	28.1	26.9	25.5	26.7	26.8	24.1	26.1	22,956
5	46.9	39.1	37.5	40.7	39.1	33.3	38.4	33,830
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	. .
Total (number)	**15,851**	**35,303**	**2,337**	**2,799**	**40,439**	**31,741**	**. .**	**88,031**
Mean score	**4.0**	**3.7**	**3.7**	**3.8**	**3.7**	**3.4**	**3.7**	**. .**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 5,456 cases (5.2% of cohort) with missing IADL data.
3. Not applicable cases: 11,405 (10.9%) recorded for people living permanently in RAC, hospitals and other institutional care, and multipurpose services.
4. Components may not add to total due to rounding.

Table A.21: PIAC cohort living in the community: source of assistance[(a)] for ADLs at reference assessment by PIAC group (per cent)

Source of ADL care provision	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
		Per cent					%	N
Formal only	22.4	16.8	17.0	23.2	17.2	10.5	15.8	13,404
Informal only	21.4	27.5	23.0	18.3	26.6	37.3	29.4	24,942
Mixed	35.5	24.2	23.8	28.5	24.5	11.6	22.0	18,628
None	20.8	31.5	36.2	30.0	31.7	40.6	32.8	27,850
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**15,495**	**34,491**	**2,302**	**2,771**	**39,564**	**29,765**	**. .**	**84,824**

(a) Source of assistance for ADLs is as reported by the client on the ACAP form. People may get formal assistance from services other than those included in the PIAC project, including private services. In addition, people may be getting HACC services, but not be identified as such through the data linkage due to the incomplete coverage of the HACC NMDS.

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 8,307 cases (7.9% of cohort) with missing source of care.
3. Not applicable cases: 11,762 (11.2%) recorded for people living permanently in RAC, hospitals and other institutional care, and public place.
4. Components may not add to total due to rounding.

Table A.22: PIAC cohort living in the community: source of assistance[(a)] for IADLs at reference assessment by PIAC group (per cent)

Source of IADL care provision	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
		Per cent					%	N
Formal only	16.8	14.4	17.5	18.7	14.9	9.8	13.4	11,403
Informal only	17.0	23.3	13.8	9.0	21.8	44.7	28.9	24,541
Mixed	55.6	52.5	60.9	65.6	53.9	25.9	44.4	37,664
None	10.6	9.8	7.8	6.7	9.4	19.6	13.2	11,216
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**15,495**	**34,491**	**2,302**	**2,771**	**39,564**	**29,765**	**. .**	**84,824**

(a) Source of assistance for IADLs is as reported by the client on the ACAP form. People may get formal assistance from services other than those included in the PIAC project, including private services. In addition, people may be getting HACC services, but not be identified as such through the data linkage due to the incomplete coverage of the HACC NMDS.

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 8,307 cases (7.9% of cohort) with missing source of care.
3. Not applicable cases: 11,762 (11.2%) recorded for people living permanently in RAC, hospitals and other institutional care, and public place.
4. Components may not add to total due to rounding.

A.6 Assessment outcomes

A completed ACAT assessment results in recommendations for long-term care setting and program support as part of a care plan. Only one long-term care setting can be recommended (either community or residential), but clients can be approved for use of more than one type of care. For example, a client may receive a recommendation for high-level residential care, and be approved to use high-level permanent residential care as well as an EACH package and/or residential respite care. In addition, a client recommended to live long term in the community may be recommended for several care programs.

Differences between recommendations and approvals may arise for three main reasons:

- Some approvals are 'just in case', where a client may be recommended to live in the community but is eligible for low-level residential care and approved for this care in case it is required.
- Some approvals are 'interim until entry to residential care' support, such as for a client who is recommended to live in residential care but to whom packaged care and residential respite care may be provided in the interim.
- In cases where the assessor and the client do not agree on care needs, approvals may reflect the client's view, whereas the recommendations reflect the assessor's view.

Once approval is granted, receiving services is subject to the availability of places and other considerations. Clients can be reassessed within the 12 month period if their care needs or attitudes change to the extent that a different level or type of care is required or desired (ACAP NDR 2006; AIHW 2007b).

Recommendations

A high proportion (70%) of people continuing on their pathway were recommended to live long term in RAC (Table A.10). This is to be expected as nearly 40% of these people were already living in residential care. Of those already living in residential care at the time of their first 2003–04 assessment, a large majority (36% out of 39%) were in low-level care. However, the majority of those recommended to live long-term in residential care were recommended for high-level care (49% out of 69%) (Table A.23). This shift reflects the requirement until June 2004 to have an ACAP approval to move from low to high residential care even if staying in the same facility.

Around half of the people in the new-pathways groups had a recommendation for living long term in a private residence. The proportion recommended to live permanently in residential care ranged from 38%, for those with no previous care, to 45% among people who had accessed both HACC and VHC services previously. While there was little difference in the proportion recommended for high care, the proportions recommended to live in low care varied across groups—between 20% and 28%. However, in all groups low-level care was proposed for over half of those recommended to live permanently in residential care.

A recommendation for respite care can only be provided for people recommended to live long term in the community. Among people recommended to live in the community, 69% had a recommendation for use of respite care (Table A.24). Nearly all of these (66% out of 69%) included a recommendation for residential respite care.

A residential respite care recommendation was much more common among those in the community continuing their path (87%) than among other groups, with the lowest

recommendation rate observed among those who had not previously used any care programs (54%). This effect is most likely due to the 12 month duration of approvals which results in the need to renew an approval to use residential respite if it is more than a year since approval was given.

If a person is recommended to live in the community, an ACAT can also make recommendations for use of a range of community programs, including those that do not need an ACAT approval for access. Such 'non-ACAP' programs include HACC, VHC, Day Therapy, and the National Respite for Carers Program (NRCP). Multiple recommendations can be made.

For all PIAC groups, CACP and HACC were the most commonly recommended community care programs (34% and 38%, respectively, among all people recommended to live in the community) (Table A.25). However, there was considerable variation across the PIAC groups. Just over half (51%) of those who had already accessed ACAT-dependent programs were recommended for a CACP and 28% were recommended for HACC. People who had not previously used care programs were least likely to be recommended for a CACP (27%); however, one-third (32%) got a HACC recommendation. HACC was most commonly recommended to people who had already accessed that program, with 49% getting a recommendation. Not surprisingly, high proportions of those who had already accessed VHC were recommended to use this program (over 50% compared with 7% overall). Carer support services, through NRCP, were recommended for between 14% and 20% of those recommended to live in the community at their reference assessment.

For the PIAC cohort, 23% of those recommended to live in the community had no community care recommendations (Table A.26). This percentage was highest among those who had not previously used any care programs (33%), and lowest for new-pathways cohort members who had already accessed VHC (under 14%). Overall, no government care programs were recommended for almost one-quarter (24%) of the new-pathways cohort recommended to stay living in the community, equating to 14% of the entire new-pathways cohort.

People most commonly had only one recommendation for community care (52% of those eligible) (Table A.26). People already accessing HACC and VHC were more likely than others to have multiple recommendations, with 13% of this group having three or more (compared with 6% across all PIAC groups).

Approvals for program use

Before ACAP clients can be given an approval to access a particular program they have to agree to the approval. In addition, clients can be given multiple approvals, including those 'just in case' a client needs to access a particular program (for example, residential respite care). Lack of client agreement is the likely cause for the smaller percentage of continuing path group members with an approval for permanent residential care compared with those with a corresponding recommendation: 57% had an approval for permanent residential care compared with 69% recommended to live long term in permanent residential care (Table A.23 and Table A.27). On the other hand, slightly greater percentages of the new-pathways groups were approved for permanent RAC than were recommended to live permanently in this setting.

Looking at the new-pathways groups, approval to use residential respite care varied between 40% and 53% of cohort members. Comparing these numbers with the respite

recommendations for those recommended to live long term in the community (over 54%; Table A.24) indicates that people recommended to live in residential care were less likely than others to get an approval for residential respite care. This could either be due to lack of agreement between client and assessment team or due to arrangements being put in place for the client to move directly into permanent residential care.

Around one-fifth of new-pathways group members and 17% of those continuing their pathway were approved for a CACP package (Table A.27). Reflecting the small size of the EACH program in 2003–04 (and noting that EACHD had not yet commenced), few people received an approval for an EACH package at their first assessment in 2003–04 (under 1% of the cohort).

Overall, 59% of the PIAC cohort got approval to use at least one ACAT-dependent care program (Table A.28). Those with no previous history of use of care programs were less likely than others to get approvals, with 52% of this group getting approvals and 48% not. People continuing on their care pathway at the time of the reference assessment were most likely to get at least one approval (64%). However, they were more likely than others to get only one approval, and further analysis showed that 26% of this group got an approval for high-level permanent residential care only compared with less than 9% in the other groups.

Among people recommended to live in the community, 48% did not get approval to use any of the ACAT-dependent programs at their reference assessment (23,778 out of 49,253; Table A.29). However, nearly two-thirds of those without any approvals (63%) got recommendations for community care programs. That some of these people (at least 13%) got recommendations for CACP and/or EACH packages even though they did not get approval reflects the disjuncture between approvals and recommendations caused by the former requiring agreement from the client. HACC use was commonly recommended for people without an approval: HACC was recommended for 52% of those with no approval and just one recommendation (6,051 out of 11,618). People who had not previously used care programs were less likely than others to have any community care recommendations: 52% of this group had community care recommendations compared with over 70% of other new-pathways ACAP clients.

Table A.23: PIAC cohort: recommended long-term care setting by PIAC group (per cent)

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
			Per cent				%	N
Private residence	26.9	53.3	51.0	49.5	52.9	55.0	46.8	49,043
Independent living within a retirement village	1.7	3.5	4.9	4.1	3.6	3.4	3.0	3,197
Supported community accommodation	0.7	1.4	1.0	0.7	1.3	1.6	1.2	1,310
RAC: low level	20.4	24.3	26.1	28.2	24.7	20.3	22.1	23,184
RAC: high level	49.2	16.3	16.1	16.6	16.3	17.3	25.2	26,475
Hospital	0.4	0.4	0.4	0.4	0.4	0.8	0.5	543
Other institutional care	0.1	0.1	0.1	-	0.1	0.2	0.1	118
Other	0.7	0.9	0.6	0.5	0.8	1.4	1.0	1,023
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**27,545**	**37,502**	**2,466**	**2,952**	**42,920**	**34,428**	**. .**	**104,893**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8).
3. Components may not add to total due to rounding.

Table A.24: PIAC cohort recommended to live in the community: respite care recommendation by PIAC group (per cent)

		HACC and/or VHC before						
	Continuing path	HACC only	VHC only	HACC and VHC	Subtotal	No previous care	Total	
Recommended for			**Per cent**				**%**	**N**
Residential respite	75.0	60.1	64.5	66.1	60.7	46.5	57.6	27,940
Non-residential respite	1.1	2.2	1.4	2.1	2.1	3.0	2.3	1,097
Both residential and non-residential residential	12.4	8.4	9.2	8.9	8.5	7.6	8.8	4,245
No recommendation	11.5	29.4	24.9	23.0	28.7	42.9	31.3	15,186
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**7,608**	**19,844**	**1,289**	**1,500**	**22,633**	**18,227**	**. .**	**48,468**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 6,106 cases (5.8% of cohort) with missing respite care recommendations.
3. Not applicable cases: 50,321 (48.0%) recorded for people recommended to live permanently in RAC, hospitals and other institutional care.

Table A.25: PIAC cohort recommended to live in the community: recommendations for community care programs by PIAC group (per cent)

Community care program	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
	Per cent with recommendation within PIAC group						%	N
CACP	51.1	35.3	28.2	33.5	34.7	27.1	34.2	18,687
EACH	3.5	1.5	0.6	1.1	1.4	0.9	1.6	846
HACC	28.3	49.2	18.3	29.0	46.2	32.0	38.0	20,721
VHC	4.8	2.9	56.0	50.8	9.0	4.9	6.8	3,696
Day therapy	6.0	4.5	3.6	4.8	4.5	3.7	4.4	2,420
NRCP	19.7	16.4	15.5	15.6	16.3	14.8	16.3	8,874
Other	5.9	7.8	8.3	8.3	7.9	8.0	7.6	4,157
Total	**8,260**	**22,114**	**1,416**	**1,619**	**25,149**	**21,164**	**. .**	**54,573**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 4,445 cases (4.2% of cohort) with missing recommendations.
3. Not applicable cases: 50,321 (48.0%) recorded for people recommended to live permanently in RAC, hospitals and other institutional care.
4. ACATs may give more than one recommendation; consequently percentages do not sum to 100.

Table A.26: PIAC cohort recommended to live in the community: number of recommendations for community care programs by PIAC group (per cent)

Number of recommendations for community care programs	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
All people				**Per cent**			**%**	**N**
0	15.9	17.0	13.9	10.6	16.4	33.1	22.8	12,442
1	56.0	55.5	52.3	51.6	55.0	47.6	52.3	28,551
2	21.5	21.2	24.0	25.3	21.6	14.8	18.9	10,333
3	5.8	5.6	8.8	9.6	6.0	3.9	5.2	2,828
4+	0.8	0.8	0.9	2.9	0.9	0.6	0.8	419
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total N	**8,260**	**22,114**	**1,416**	**1,619**	**25,149**	**21,164**	**. .**	**54,573**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 4,445 cases (4.2% of cohort) with missing recommendations.
3. Not applicable cases: 50,321 (48.0%) recorded for people recommended to live permanently in RAC, hospitals and other institutional care).
4. Components may not add to total due to rounding.

Table A.27: PIAC cohort: approval for ACAT-dependent programs by PIAC group (per cent)

Care type	Continuing path	HACC and/or VHC before: HACC only	HACC and/or VHC before: VHC only	HACC and/or VHC before: HACC and VHC	HACC and/or VHC before: Subtotal	No previous care	Total	
Residential respite care			**Per cent**				**%**	**N**
Low	22.2	35.4	40.4	39.6	36.0	28.8	30.0	27,818
High	15.2	12.3	13.0	12.3	12.4	10.8	12.6	11,695
Not approved	62.6	52.3	46.6	48.1	51.7	60.3	57.4	53,326
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**92,839**
Permanent residential care								
Low	20.2	28.9	32.2	33.9	29.5	23.6	25.0	23,254
High	36.8	14.2	14.7	13.8	14.2	14.3	20.2	18,723
Not approved	43.0	56.9	53.2	52.3	56.4	62.1	54.8	50,862
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**92,839**
CACP								
Approved	16.5	22.0	20.0	20.7	21.8	17.9	19.1	17,733
Not approved	83.5	78.0	80.0	79.3	78.2	82.1	80.9	75,106
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**92,839**
EACH/multi-purpose approval								
EACH Package	0.9	0.7	0.6	0.5	0.7	0.5	0.7	636
Multipurpose service/other	0.4	0.6	0.5	0.3	0.6	0.7	0.5	506
Not approved	98.8	98.7	98.9	99.2	98.7	98.8	98.8	91,697
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**92,839**
Total (number)	**24,420**	**32,458**	**2,195**	**2,621**	**37,274**	**31,145**	**. .**	**92,839**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 12,054 cases (11.5% of cohort) with missing approvals (note: no approvals were recorded for South Australia).
3. Components may not add to total due to rounding.

Table A.28: PIAC cohort: number of approvals for ACAT-dependent programs by PIAC group (per cent)

Number of approvals	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
				Per cent			%	N
None	35.5	40.6	36.6	38.2	40.2	47.5	41.4	38,441
1	30.6	18.4	19.3	16.4	18.3	18.7	21.7	20,125
– for permanent RAC	26.1	7.5	7.6	7.2	7.5	8.6	12.7	11,833
– for respite RAC	4.0	7.2	9.7	6.9	7.3	6.4	6.1	5,709
– for CACP only	0.5	3.6	1.8	2.3	3.4	3.5	2.7	2,488
– for EACH/ multipurpose service	0.0	0.1	0.2	0.0	0.1	0.1	0.1	95
2	20.5	27.6	30.5	31.7	28.0	23.6	24.6	22,808
3	13.1	13.2	13.4	13.4	13.2	10.0	12.1	11,236
4	0.3	0.3	0.2	0.3	0.3	0.2	0.2	229
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**. .**
Total (number)	**24,420**	**32,458**	**2,195**	**2,621**	**37,274**	**31,145**	**. .**	**92,839**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 12,054 cases (11.5% of cohort) with missing approvals (note: no approvals were recorded for South Australia).
3. Components may not add to total due to rounding.

Table A.29: PIAC cohort recommended to live in the community but who did not get any approvals: number of recommendations for community care programs by PIAC group (per cent)

Number of recommendations for community care programs	Continuing path	HACC and/or VHC before				No previous care	Total	
		HACC only	VHC only	HACC and VHC	Subtotal			
0	26.3	28.6	25.9	19.4	27.9	47.6	36.9	8,772
1	54.2	55.0	51.1	55.1	54.8	42.2	48.9	11,617
– for CACP	32.1	12.3	8.4	9.6	11.9	7.5	12.1	2,870
– for EACH	2.1	0.7	—	0.2	0.6	0.7	0.8	187
– for HACC	12.7	34.0	9.0	13.9	31.5	22.9	25.4	6,051
– for VHC	1.6	1.5	28.5	26.3	4.5	2.4	3.2	756
– for Day therapy	0.8	1.0	0.6	0.6	1.0	1.1	1.0	236
– for NRCP	2.4	1.9	1.9	1.6	1.9	2.7	2.3	549
– for Other	2.4	3.6	2.7	2.9	3.5	5.0	4.1	968
2	15.9	13.6	18.6	18.4	14.2	8.5	11.7	2,784
3	3.3	2.5	4.0	5.4	2.8	1.7	2.3	552
4+	0.3	0.2	0.4	1.6	0.3	0.1	0.2	52
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	
Total N	**2,617**	**8,962**	**522**	**624**	**10,108**	**11,052**	**. .**	**23,777**
Total recommended to live in the community	**7,430**	**19,550**	**1,260**	**1,452**	**22,262**	**19,562**	**. .**	**49,254**

Notes

1. See Box 1.2 for definition of the PIAC groups. Reference assessment is the first completed ACAT assessment in 2003–04.
2. Table excludes South Australia as no approvals were reported for that state; hence the difference between the bottom row in this table and that in Table A.26.
3. Table excludes 184 cases with a pathway that indicated death before receipt of care (excluding HACC) (see Table C.8), and 9,764 cases (9.3% of cohort) with missing approvals (including 5,319 cases for South Australia).
4. Not applicable cases: 50,321 (48.0%) recorded for people recommended to live permanently in RAC, hospitals and other institutional care.
5. Components may not add to total due to rounding.

Appendix B: Data issues

B.1 ACAP

The following data quality issues should be noted.

1. Implementation of the ACAP NMDS v2 was done on a regional basis. By 14 July 2003, all jurisdictions except New South Wales and Queensland were reporting on ACAP using NMDS version 2. For the latter two states, implementation was as follows:
   - New South Wales: progressive implementation from 1st July 2003 to June 2005.
     - In June 2004, 36 teams were collecting NMDS v2 and 14 teams were collecting NMDS v1 data.
     - In June 2005, all 50 teams were collecting NMDS v2; however, 4 teams still collected some NMDS v1 data during this month.
   - Queensland: No NMDS v2 data was collected in 2003–04 or 2004–05. Take up was completed in October 2005.

   Overall, 70% of all ACAT assessments carried out in 2003–04 were reported at the person-level using NMDS v2, and there was 85% coverage in 2004–05 (ACAP NDR 2005, ACAP NDR 2006).
2. Postcode was not correctly recorded by Northern Territory ACATs in 2003–04 or 2004–05. However, first digit of postcode ('0') was sufficiently reliable for identifying Northern Territory clients.
3. Australian Capital Territory ACAT clients in 2003–04 and 2004–05 NMDS v2:
   - usual accommodation cannot be determined with any certainty from the NMDS as the data were missing or unreliable in that period. This makes it difficult to determine whether a client recommended to residential care was already living in residential care or not. This problem affects analysis rather than data linkage.
   - place of assessment data are poor
   - only one health condition was reported.
4. South Australian ACAP data has poor date information, and all approvals (but not recommendations) are missing on the NMDS for 2003–04 and 2004–05. Poor dates could have a small effect on the reliability of links for South Australian data, and will affect the analysis of pathways for South Australian clients in that the order of program use may not always be reliable. Missing approvals data will impinge on the analysis of pathways for South Australian clients.
5. Continence data (as a medical condition) are poor in ACAP NMDS v2.
6. Several data items had high missing value rates for applicable cases for the first completed assessment in 2003–04:
   - carer availability (10%)
   - carer co-residency status (13%)
   - carer relationship (24%)
   - DVA entitlement (19%)

7. People may access unfunded places in government-funded residential aged care facilities without having an ACAT assessment. These RAC residents do not receive a government RAC subsidy. Stays in RAC associated with unfunded places are not included on the ACCMIS database as this is primarily a subsidy payment system. However, an ACAT assessment is needed before someone in an unfunded place can move into a funded place (that is, receive the subsidy). People in this situation would be reported as usually living in a RAC at the time of their assessment.

   Residents in unfunded places are commonly partners of people in funded places, and it is estimated that they number between 1% and 3% of the number of funded places (James Underwood & Associates Pty Ltd 2002). At 30 June 2003 there were just over 151,000 funded RAC places (AIHW 2004), suggesting that there were between 1,500 and 4,500 unfunded places at that time.

B.2 HACC: derivation of periods of use

A wide range of services is provided through HACC, and those reported on the HACC NMDS are listed in Table B.1. For the PIAC study, HACC clients were defined as out of scope if they only used assessment and/or case management and/or carer services during the period of interest. In the HACC NMDS carer services include respite care and carer counselling, with the latter only introduced with the implementation of HACC NMDS v2 in 2005–06. These exclusion rules were applied to the quarterly data prior to the linkage process.

The issues

The HACC NMDS data in the PIAC project only indicate quarter of use and not specific dates. In addition, just over 80% of HACC agencies participate in the NMDS. Furthermore, some HACC services can be accessed by people on community care packages and some cannot, depending on the package type. Specifically:

- Nursing and allied health can be accessed by Community Aged Care Package (CACP) recipients.
- Centre-based day care can be accessed by CACP and EACH(D) package recipients.
- Other HACC services should not be accessed by CACP and EACH(D) package recipients.
- HACC services should not be accessed by people living permanently in residential aged care (RAC).

These issues raise the question of how to present HACC use in the PIAC care pathways. In particular,

- How can we tell if HACC services were accessed before or after the first ACAT assessment when they occurred in the same quarter?
- How do we deal with incomplete coverage of the NMDS?
- Given the poor service use dates available on the NMDS, how do we allow for concurrent HACC and community package use in the care pathways?

Based on a range of analyses the following approach has been adopted (AIHW 2009).

The approach

HACC service events to be used in the presentation of care pathways are given dates that are derived using the following algorithm:

1. Use of HACC services is assumed to be as reported on the NMDS; that is, no adjustment or imputation is made for agency non-participation.
2. HACC events are initially identified in terms of four service groups:
   - Nursing and Allied health services
   - Centre-based day care
   - other high-frequency services
   - low-frequency services.
3. To start with, HACC event start dates are assumed to be the first day of the first quarter of a set of contiguous quarters in which the service group use was identified; end dates are assumed to be the last day of the last quarter in the set.
4. All HACC services are considered to have stopped (or not to have started) when links in the care pathway that indicate the person:
   - was in permanent RAC, or
   - had died.
5. For other start and end dates:
   - Concurrent use of HACC Centre-based day care services and a CACP or EACH package is allowed, and so does not affect HACC event dates.
   - Concurrent use of HACC Nursing and Allied health services and a CACP is allowed, and so does not affect HACC event dates.
   - Nursing and Allied health service use is considered to have stopped once a person started on an EACH(D) package, or not to have started until a person ceased using the EACH(D) package.
   - All other HACC service use is considered to have stopped once a person started on a CACP or EACH(D) package, or not to have started until a person ceased using a CACP or EACH package.
6. To derive HACC events across service groups, derived HACC service group events are combined if they overlap at all. (Note, however, that pathways can also be presented using HACC service group types.)
7. HACC assessment dates and first-ever quarter of HACC use (including HACC services that are out-of-scope for PIAC) are used to identify a 'first use of HACC' date and so to indicate whether HACC services were used/approached before the first ACAT assessment started. In cases where no HACC assessment dates were reported for a client on the NMDS and first HACC contact was in the same quarter as the start of the ACAT assessment, it is assumed that the ACAT assessment led to the use of HACC services.

Table B.1: HACC services recorded on the HACC NMDS

Service	Collection	Service category
Assessment (hours)	v1, v2	Client management
Care coordination (hours)	v2	Client management
Case management (hours)	v1, v2	Client management
Case planning / review (hours)	v1	Client management
Carer counselling (hours)	v2	Carer services
Respite care (hours)	v1, v2	Carer services
Nursing care received at centre (hours) *	v1, v2	Nursing/allied health
Nursing care received at home (hours) *	v1, v2	Nursing/allied health
Allied health care received at centre (hours) *	v1, v2	Nursing/allied health
Allied health care received at home (hours) *	v1, v2	Nursing/allied health
Centre-based care (hours) **	v1, v2	High frequency (mainly)
Personal care (hours)	v1, v2	High frequency (mainly)
Domestic assistance (hours)	v1, v2	High frequency (mainly)
Meals at home (number meals)	v1, v2	High frequency (mainly)
Meals received at centre (number meals)	v1, v2	High frequency (mainly)
Other food services (hours)	v1, v2	High frequency (mainly)
Formal linen service (deliveries)	v1, v2	High frequency (mainly)
Social support (hours)	v1, v2	High frequency (mainly)
Transport -(one way trips)	v1, v2	High frequency (mainly)
Counselling (hours)	v1, v2	Low frequency (mainly)
Home maintenance (hours)	v1, v2	Low frequency (mainly)
Aids		
Communication Aids	v1, v2	Low frequency (mainly)
Medical Care Aids	v1, v2	Low frequency (mainly)
Reading aids	v1, v2	Low frequency (mainly)
Self care aids	v1, v2	Low frequency (mainly)
Support and mobility aids	v1, v2	Low frequency (mainly)
Other Goods/Equipment	v1, v2	Low frequency (mainly)
Home modification ($)	v1, v2	Low frequency (mainly)
Car modifications	v1, v2	Low frequency (mainly)

Note: NMDS v2 was implemented during 2005–06.

* can be accessed by people on CACP

** can be accessed by people on CACP/EACH/EACHD

Results

Almost 75,400 HACC clients linked to the ACAP cohort (Table 1.2). After adjusting HACC events for inclusion in care pathways using the above algorithm, the final set of HACC events relates to 71,844 people. This difference is caused primarily by dropping HACC events due to incompatibilities with other care events (AIHW 2009).

The adjustments to HACC events resulted in an overall reduction in the number of HACC events by between 3% (Centre-based day care) and 12% (low frequency services) (Table B.2). As would be expected, the number of reductions increased as the number of allowable concurrent program uses decreased. It is thought that this apparent 'illegal' use of services could be due to poor data recording practices (e.g. recording a service against the wrong program by service providers who get funding from more than one program), and/or by the use of services in one program when 'on leave' from another program (e.g. when on social leave from permanent RAC).

The number of first HACC events with the initial ACAP assessment in the same quarter varied between 7% and 12%, depending on the HACC service group. Overall 8.5% of the adjusted HACC events (9,095 events combined across service groups) had first use of HACC and first ACAT assessment in the same quarter (Table B.2). Using the algorithm described above, it was assumed that the ACAT assessment led to the use of HACC services for 28% of these 9,095 events (2,573 events, Table B.3).

Table B.2: Summary of HACC event adjustments for ACAP cohort, NMDS 2002–03 to 2005–06, clients in PIAC cohort

	HACC service group									
	Nursing/Allied health		High frequency		Low frequency		Centre-based day care		All combined[(a)]	
	N	%	N	%	N	%	N	%	N	%
Events before adjusting	65,461	100.0	80,419	100.0	46,287	100.0	20,889	100.0	. .	. .
Adjusted events for pathway	62,831	96.0	72,642	90.3	40,909	88.4	20,209	96.7	107,443	. .
First HACC event in same quarter as first ACAP assessment[(b)]	7,197	11.5	6,472	8.9	4,249	10.4	1,432	7.1	9,095	8.5

(a) Overlapping HACC events of different types are combined into single HACC events for more general analysis of HACC use in pathways.

(b) Per cent given as per cent of 'Adjusted events for pathway'.

Table B.3: 'First seen' HACC date compared with first ACAP assessment date, PIAC cohort with first HACC and first ACAP event in the same quarter

HACC use/assessment compared with ACAP assessment quarter	Number	Per cent
Earlier quarter	1,321	14.5
Same quarter		
With known assessment date before ACAP assessment	1,655	18.2
With known assessment date same or after ACAP assessment	3,500	38.4
Sub-total	*5,155*	*56.7*
With unknown assessment date	2,573	28.3
Total	*7,728*	*85.0*
Later quarter	46	0.5
Total	**9,095**	**100.0**

Note: 'First seen' on HACC includes use of PIAC 'out-of-scope' HACC services. HACC assessment date for comparing to ACAP assessment date is derived as the earliest date out of the first HACC assessment date and the last date of first quarter that a client is reported for HACC.

B.3 VHC: derivation of periods of use

The VHC program provides a limited range of services to help veterans, war widows and widowers with low-level care needs to remain living in their own homes longer. The types of assistance provided through the program are:

- Domestic assistance (DA)
- Home and garden maintenance (HG)
- Transitional home and garden maintenance (HT) provided to clients who transferred from HACC and so who may have a higher service level entitlement
- Personal care (PC): clients with a higher level of need than provided by VHC may be transferred to DVA community nursing services, so a gap in provision may mean either an improvement or deterioration in health.
- Emergency respite (RE), generally limited to 3 days duration and three episodes a year
- In-home respite care (RI): the service limits for this are related to the provision of residential respite care
- Residential respite care (that is, respite RAC).

The data

Detailed administrative data on the provision of services through VHC are maintained by the Department of Veterans' Affairs. Information on client characteristics, assessments for service use, approvals for service provision and actual service provision are collected separately for each of the above service types for each client, except for respite RAC. For this last, VHC data report service plans (thereby indicating approval for use) for care but not the amount of residential respite care received by the client. Since use of respite RAC is incorporated into PIAC using data from ACCMIS this gap affects the care pathways only to the extent that we may not identify that the client accessed RAC via VHC.

The data collected on service provision has two components:

- Service plans, or approvals (by service type). For each service plan the data recorded are
  - a service plan start, always starting on a Monday
  - a service plan end date, always finishing on a Sunday
  - total approved hours.
- Claim data, showing
  - each date the service was provided
  - the actual number of hours provided at that visit.

Where a service is provided more than once a day, each attendance has its own claim data.

Comparison of the service plan and claim data show that a client may have approval to receive services but not receive them. In addition, in the VHC data available for PIAC, while the dates of actual service provision were generally within the service plan period, around 7% of provision dates care occurred outside stated service plan dates.

Derivation of periods of service provision for PIAC

To incorporate the provision of VHC services into the PIAC pathways, it was necessary to combine the above very detailed data on service provision into information on periods of service provision during which the client could be said to have been accessing VHC services. The method used to amalgamate the data on service plans and provision to obtain periods of VHC access was as follows.

For each service type (except respite RAC):

1. Exclude service plans during which there was no associated service provision.
2. Amalgamate service plans directly adjacent (that is, a plan finishing on one day and the next plan starting on the following day), or overlapping, another.
3. Amalgamate 'close' service plans, where two adjacent service plans were said to be 'close' if the gap between the end of one service plan and the beginning of the next was less than a specified number of weeks. 'Close' (or allowable) gaps were defined as follows:
   - For DA and PC: ≤ 4 weeks
   - For RI: ≤ 8 weeks
   - For HG and HT: ≤ 13 weeks, to allow for people who receive this service once every 3 months
   - For ER: no amalgamation as this is an emergency service which should not be provided on a regular basis (that is, all gaps retained).

   The concept of allowable gaps arose from the common occurrence of a client being given a single instance of service in a service plan that lasted 1 or 2 weeks, followed by a gap and then a similar service plan. Consequently, the person was getting a single instance of service at a regular period, say every 4 or 6 weeks, but associated service plans and provision were not being amalgamated in step 2. The allowable gap to identify 'close' service plans was determined separately for each service type by looking at the gap between service plans, the length of service plans, the gap between service provision in adjacent service plans, and the number of times the person received assistance for the service type.
4. Dates of period of use for a particular service type for PIAC were then:
   - start date = first service provision date within the combined service plans
   - end date = last service provision date within the combined service plans.

Periods of use of VHC considering all service types together were derived by amalgamating periods of use with up to a 14 day gap (including overlapping periods, as derived in steps 1 to 4 above) across all service types, and using the first and last service use dates from the resulting combined periods.

Results

After amalgamation of records into episodes of care using the algorithm described above, the VHC data set contained 228,261 care episodes for 122,447 clients.

Table B.4: Summary of VHC events for PIAC cohort study, VHC January 2001–March 2008

	Episodes	Clients
Domestic assistance	121,675	106,901
Home and garden maintenance	64,626	38,142
Transitional home and garden maintenance (clients transferred from HACC)	4,530	2,922
Personal care	10,082	9,376
Emergency respite	830	731
In-home respite care	26,518	22,254
All	**228,261**	**122,447**

Appendix C: Data linkage strategy for the PIAC cohort study[5]

C.1 Introduction

The PIAC cohort study required linking 10 data sets covering six aged care programs and deaths. Data linkage for the PIAC cohort study was undertaken using multiple deterministic match passes in conjunction with an algorithm for identifying suitable match keys and the order in which they should be used. The deterministic match keys were based on (but not limited to) components of the statistical linkage key SLK-581 (consisting of 5 letters of name, date of birth and sex). To meet the conditions of the project's ethics approvals, this practice was used even when name data were available.

To avoid unnecessary matching processes, a staged approach was employed which progressively linked the data sets two at a time (Figure C.1). Central to this strategy was the recognition that, for the PIAC study, the cohort of interest was those people who had a completed assessment reported on the 2003–04 ACAP NMDS. The order of linking the data sets was based on the availability of additional data for linkage and the quality of the linkage data. For PIAC, there were seven linkage stages in all, with match rates estimated to range from 3% to over 60%, depending on the stage (based on one-step deterministic matching using SLK-581, Table C.1).

C.2 Linkage strategy

The stepwise deterministic linkage strategy for each stage consisted of four phases. These are outlined below using Stage 3 to illustrate the processes. Stage 3 matched integrated residential care and community care packages (RCCP) data to the 2003–04 ACAP NMDS (i.e. the PIAC cohort). Simple deterministic matching using SLK-581 showed that at least 64% of the PIAC cohort would link to the RCCP data set (Table C.1).

Phase 1: Client identification within the two data sets

Individual clients are identified differently on the various data sets, depending on whether the data set contains an administrative program client identifier (Table C.1). There is no unique program client identifier in the ACAP NMDS, and full name is not recorded. Consequently, distinct clients can only be specified using SLK-581 and other distinguishing variables. Region of usual residence is commonly available and is also useful for distinguishing between individuals. When defining clients with such data there is a trade-off between under-identification and over-identification of individuals. In the PIAC study, a small level of over-identification was preferred to under-identification to avoid identifying people as using services they had not accessed. Accordingly, clients were defined using

5 Much of this discussion is presented in a reduced form in Karmel et al. 2010. It is repeated here in more detail for completeness.

SLK-581 in conjunction with broad region of usual residence (first digit of postcode, corresponding broadly to the six states and the Northern Territory, with postcodes in the Australian Capital Territory grouping with New South Wales).

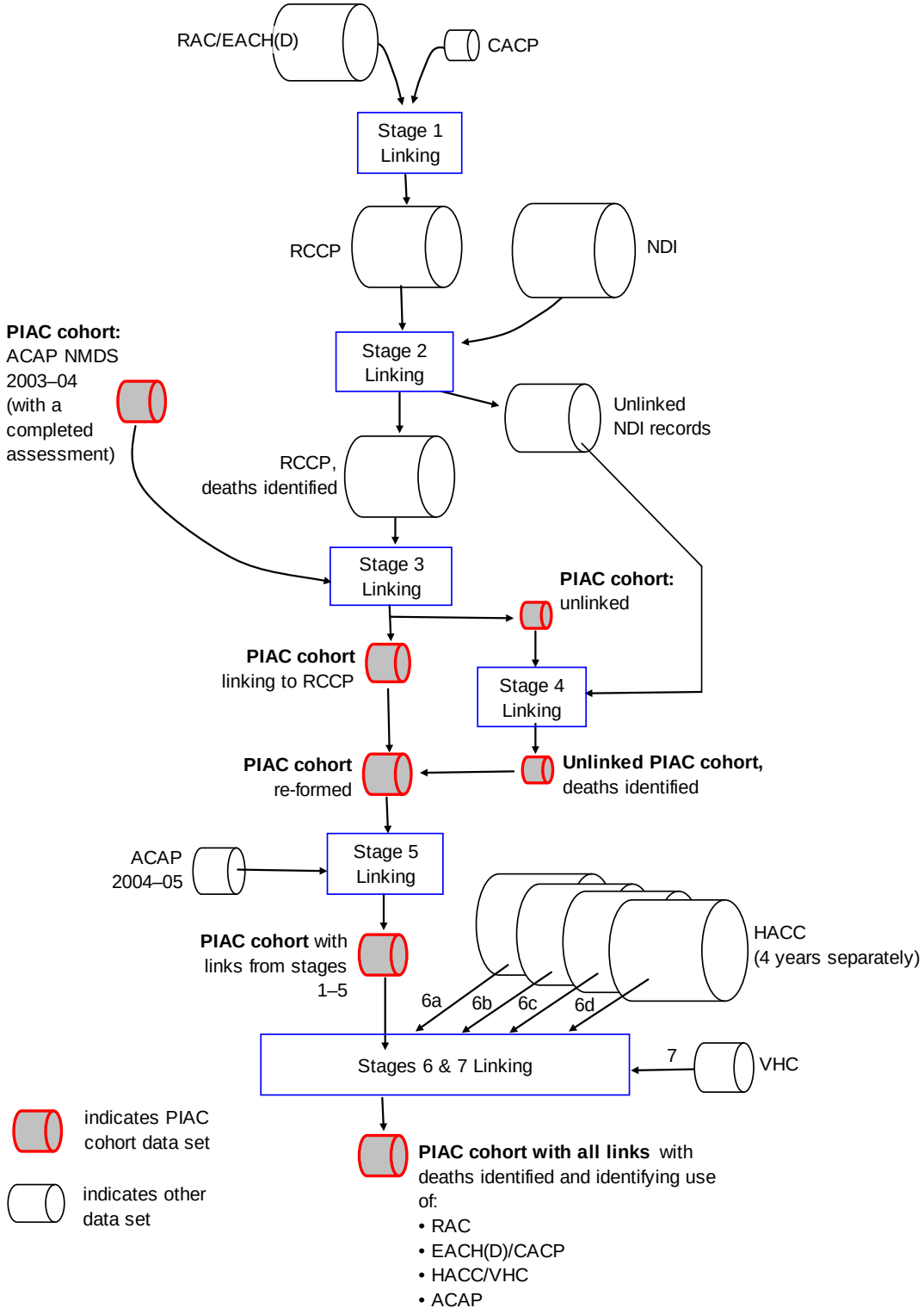


Figure C.1: Linkage stages for PIAC cohort study

In the residential care data set and community care packages data set, clients are identified through administrative processes. Occasionally duplicate client records occur (AIHW: Karmel 2005a). Such duplicates were identified using data on name, date of birth and postcode of residence in the community; repeat records were deleted. These two data sets were linked in stage 1.

Table C.1: Linkage stages in the PIAC project

			Minimum match rate (from one-step deterministic linkage on SLK-581)		Final match rate (from stepwise deterministic linkage)	
Stage	Data set 1	Data set 2	% data set 1	% data set 2	% data set 1	% data set 2
1	Residential care 2002–06[(a)]	Community care packages 2002–06[(a)]	9.4	44.0	10.2	47.7
2	Deaths July 2003–Dec 2006[(a)]	RCCP 2002–06[(a)] (from Stage 1)	32.6	36.9	36.2	41.0
3	PIAC cohort (ACAP 2003–04)[(b)]	RCCP 2002–06	64.4	16.3	72.6	18.4
4	Deaths July 2003–Dec 2006 not linked to RCCP [(a)]	ACAP 2003–04 not linked to RCCP[(b)]	3.0	31.4	3.3	34.7
5	PIAC cohort[(b)]	Aged care assessments 2004–05[(b)]	29.4	21.8	30.9	22.9
6a	PIAC cohort[(b)]	HACC 2002–03[(b)]	41.6	7.1	46.3	7.9
6b	PIAC cohort[(b)]	HACC 2003–04[(b)]	53.4	8.3	58.5	9.1
6c	PIAC cohort[(b)]	HACC 2004–05[(b)]	35.9	5.3	39.5	6.0
6d	PIAC cohort[(b)]	HACC 2005–06[(b)]	22.8	3.4	26.2	3.9
7	PIAC cohort[(b)]	VHC January 2001 – March 2008[(a)]	11.4	7.3	12.2	7.8

(a) Clients identified through administrative processes, and de-duplication.

(b) Clients identified by SLK-581 within broad region (1st digit of postcode).

Note: For the data sets with administratively-derived person identifiers, data for all years in the study were linked at the same time. For data sets with clients identified by SLK-581 data were linked for each year separately to allow for variation over time in reported SLK-581.

Phase 2: Identifying data for matching the specific data set pair

The data to be used for linking are context-dependent (Table C.5). For Stage 3, three additional variables were identified for matching in addition to SLK-581:

- Postcode of usual residence
- ACAT assessment date
- ACAT id

For ACAP, the postcode reported at the first completed assessment in 2003–04 was used for matching (available for 98% of clients). The ACAP assessment date and ACAT id data related to the same assessment. There are several dates reported on the ACAP NMDS. After some testing, a combination of two dates (delegation date and assessment end date) were

used for matching. Assessment end date was available for all ACAP clients and delegation date was available for 63%. The latter was preferred for matching when available.

The RCCP data can contain several postcodes relating to the same client over a year: the postcode of usual residence when on a CACP, the postcode of usual residence before going into RAC and the postcode of any RAC facility the person uses. When linking RCCP to ACAP up to three postcodes were used: the client's postcode when the client was a CACP recipient, the client's postcode in the community before entering RAC and the postcode of the RAC facility the client first used as a permanent resident in 2003–04. Not all postcodes were relevant and available for all clients: 99% had at least one community postcode (either for CACP or pre-RAC) and 46% had a postcode relating to a RAC facility. Because ACAP is a gate-keeper program for accessing CACP, EACH(D) and RAC, the community postcode(s) was preferred over that for RAC if both were available.

While ACAP assessments are required to access CACP, EACH(D) and RAC services, they are only required to maintain access in the case of short-term respite RAC. Consequently, only 27% of RCCP clients had an ACAP assessment in 2003–04. Data from the first assessment in 2003–04 on the RCCP data set were used for matching.

Phase 3: Identification of keys to use in matching

Within a PIAC linkage stage, match keys were identified for linking by evaluating a large range of keys based on the following key elements:

- three letters of surname (s3) in SLK-581 (always together)
- two letters of given name (g2) in SLK-581 (always together)
- day and month of birth (dmob, always together)
- year of birth (yob)
- sex (s)
- region (using state (st), full four-digit postcode (pc), or first two digits of postcode (pc2))
- additional event date for matching
- other additional data for matching.

The specific data used for linking at each stage were context-dependent (Table C.5). As stated above, for Stage 3, the linkage additional data were postcode, ACAT assessment date and ACAT id.

There are many combinations of the key elements that could be used to define match keys. For example, there are 128 possible keys based on the presence or absence of the first six elements above, using the three regional groupings separately (Table C.2). Many of the keys listed in Table C.2 are too broad to be considered for deterministic linking. To select keys to be considered for matching, only keys that were estimated to have fewer than four times as many people with non-unique match keys as there were for SLK-581 were investigated (i.e. duplicate rate of less than 4%, noting that previous analyses indicated that SLK-581 has a duplicate rate of under 1% in aged care programs) (AIHW: Karmel 2005a; AIHW: Ryan et al. 1999). Keys 1 to 20 in Table C.2 met this criterion. Using additional variables increases the number of theoretically possible distinct keys and hence the number of potential match keys that meet this criterion.

In the absence of data for clerical review (specifically name data for the NMDSs), the decision on whether a particular match key combination could be used for matching two particular data sets was based on three measures:

- Measure A: A measure of *discriminating power* (termed the joint unique key rate, and expressed as %). This is the product of the unique key rates for the two data sets being linked, where the unique key rate is the proportion of records within a data set that have a unique value for the key in question. A discriminating power of at least 95.0% was required for the key to be considered for matching, equating to a unique key rate of at least 97.5% within each data set. This measure assumes that rare combinations of variables within a data set are less likely than more common combinations to result in false matches between data sets.
- Measure B: An *estimated false match rate* (FMR) for links established using the match key. This measure had to be 0.5% or less for a key to be considered for the matching process.
- Measure C: *Estimated trade-off* between additional true and additional false matches for links established using the match key when compared with matches made by a slightly more precise key. The ratio of additional true to additional false matches had to be at least 2:1 for the key to be used for matching.

All three criteria had to be met by a potential match key for it to be included in the stepwise linking.

The above three measures were calculated prior to full linkage, with the latter two derived by applying the approximation methods outlined in Karmel & Gibson 2007. In the current context, when matching data for programs 1 and 2, FMR was approximated by

$FMR = r \times P / \beta\alpha$

where:

P is the size of the population (in 1,000s)

r is the usage rate of program 1 as indicated by its data set (per 1,000 people in population P)

α is the proportion of people using program 2 matching to those using program 1 when using a specific match key combination to match

β reflects the number of comparison cells specified by the components of the particular match key being used, allowing for uneven client spread across cells.

The linkage rate α for a specific match key was gauged by using only that key for simple deterministic matching. FMR (measure B) was then derived, which also allowed estimation of the trade-off between true and false matches for a specific match key combination when compared with the results from a more exact key (measure C).

Estimates for the above measures for Stage 3 are presented in Table C.3. For comparative purposes, an estimated 'worst case' false match rate is also presented. Overall, 115 match keys were selected to match the RCCP data set to the ACAP NMDS 2003–04, including 19 without ACAP assessment data.

Table C.2: Keys based on components of SLK-581 and region

Key no.	Key description[(a)]	Key no.	Key description[(a)]	Key no.	Key description[(a)]
1	s3g2|dmyob|s|pc	44	s3g2|__yob|s|st	87	_g2|__yob|_|pc2
2	s3g2|dmyob|_|pc	45	_g2|dmyob|s|st	88	__|__yob|_|pc
3	s3g2|dm_ob|s|pc	46	s3_|dm_ob|_|pc2	89	s3g2|___ob|_|_
4	s3g2|dmyob|s|pc2	47	s3g2|__yob|_|st	90	_g2|dm_ob|_|_
5	s3_|dmyob|s|pc	48	_g2|dmyob|_|st	91	s3_|_yob|_|_
6	s3g2|dm_ob|_|pc	49	_g2|__yob|s|pc	92	s3_|___ob|s|pc2
7	s3g2|dmyob|_|pc2	50	s3_|dm_ob|s|st	93	__|dmyob|_|_
8	s3_|dmyob|_|pc	51	s3g2|__yob|s|_	94	__|dm_ob|s|pc2
9	s3g2|dmyob|s|st	52	_g2|dmyob|s|_	95	_g2|__yob|s|st
10	s3g2|dmyob|_|st	53	_g2|__yob|_|pc	96	s3_|___ob|_|pc2
11	s3g2|__yob|s|pc	54	s3_|dm_ob|_|st	97	__|dm_ob|_|pc2
12	_g2|dmyob|s|pc	55	s3g2|__yob|_|_	98	_g2|__yob|_|st
13	s3g2|dmyob|s|_	56	s3g2|___ob|s|pc2	99	s3_|___ob|s|st
14	s3g2|__yob|_|pc	57	s3_|___ob|s|pc	100	__|dm_ob|s|st
15	_g2|dmyob|_|pc	58	_g2|dmyob|_|_	101	_g2|__yob|s|_
16	s3g2|dmyob|_|_	59	_g2|dm_ob|s|pc2	102	s3_|___ob|_|st
17	s3g2|dm_ob|s|pc2	60	__|dm_ob|s|pc	103	__|dm_ob|_|st
18	s3_|dm_ob|s|pc	61	s3_|__yob|s|pc2	104	_g2|__yob|_|_
19	s3_|dmyob|s|pc2	62	__|dmyob|s|pc2	105	_g2|___ob|s|pc2
20	s3g2|dm_ob|_|pc2	63	s3_|dm_ob|s|_	106	__|___ob|s|pc
21	s3_|dm_ob|_|pc	64	s3g2|___ob|_|pc2	107	__|__yob|s|pc2
22	s3_|dmyob|_|pc2	65	s3_|___ob|_|pc	108	s3_|___ob|s|_
23	s3g2|dm_ob|s|st	66	_g2|dm_ob|_|pc2	109	__|dm__ob|s|_
24	s3_|dmyob|s|st	67	__|dm_ob|_|pc	110	_g2|___ob|_|pc2
25	s3g2|dm_ob|_|st	68	s3_|__yob|_|pc2	111	__|___ob|_|pc
26	s3g2|___ob|s|pc	69	__|dmyob|_|pc2	112	__|__yob|_|pc2
27	s3_|dmyob|_|st	70	s3_|dm_ob|_|_	113	s3_|_ob|_|_
28	_g2|dm_ob|s|pc	71	s3g2|___ob|s|st	114	__|dm_ob|_|_
29	s3g2|__yob|2|pc2	72	_g2|dm_ob|s|st	115	_g2|___ob|s|st
30	s3_|__yob|s|pc	73	s3_|__yob|s|st	116	__|__yob|s|st
31	_g2|dmyob|s|pc2	74	__|dmyob|s|st	117	_g2|___ob|_|st
32	__|dmyob|s|pc	75	s3g2|___ob|_|st	118	__|__yob|_|st
33	s3g2|dm_ob|s|_	76	_g2|dm_ob|_|st	119	_g2|___ob|s|_
34	s3g2|___ob|_|pc	77	s3_|__yob|_|st	120	__|__yob|s|_
35	s3_|dmyob|s|_	78	_g2|___ob|s|pc	121	_g2|___ob|_|_
36	_g2|dm_ob|_|pc	79	__|dmyob|_|st	122	__|__yob|_|_
37	s3g2|__yob|_|pc2	80	_g2|__yob|s|pc2	123	__|___ob|s|pc2
38	s3_|__yob|_|pc	81	__|__yob|s|pc	124	__|___ob|_|pc2
39	_g2|dmyob|_|pc2	82	s3g2|___ob|s|_	125	__|___ob|s|st
40	__|dmyob|_|pc	83	_g2|dm_ob|s|_	126	__|___ob|_|st
41	s3g2|dm_ob|_|_	84	s3_|__yob|s|_	127	__|___ob|s|_
42	s3_|dmyob|_|_	85	_g2|___ob|_|pc	128	__|___ob|_|_
43	s3_|dm_ob|s|pc2	86	__|dmyob|s|_		

(a) Key is a concatenation of data elements (see Abbreviations). '_' indicates the element was used, with '___ob' implying no elements of date of birth are included in the key. Key 128 is the null key (i.e. the same value for all records).

Note: Order is from multiplying the number of the largest categories that account for roughly half of the clients within each key element (s3: 204, g2: 20, dmob: 182, yob: 16, s: 1, st: 2, pc2: 8, pc: 290). Key 13 is SLK-581.

Table C.3: Criteria for selecting match keys for PIAC Stage 3

Key	Linkage key	Joint. unique key rate (measure A)	[a]Est. number of links	Est. FMR (measure B)	[b]Comp-arison key	Marginal true: false (measure C)	[c]Est. 'worst case' FMR
1	s3g2|dmYOB|s|pc	99.999	55631	0.00	701	>1000	0.04
2	s3g2|dmYOB|_|pc	99.957	56120	0.00	702	>1000	0.09
3	s3g2|dm_ob|s|pc	99.878	57047	0.01	703	>1000	0.82
4	s3g2|dmYOB|s|pc2	99.993	63788	0.01	704	>1000	0.55
5	s3_|dmYOB|s|pc	99.896	56819	0.01	705	925.9	0.48
6	s3g2|dm_ob|_|pc	99.878	57547	0.02	706	578.7	1.63
7	s3g2|dmYOB|_|pc2	99.934	64338	0.02	707	592.1	1.09
8	s3_|dmYOB|_|pc	99.896	57326	0.03	708	466.2	0.95
9	s3g2|dmYOB|s|st	99.981	67206	0.04	709	317.7	1.93
10	s3g2|dmYOB|_|st	99.897	67781	0.08	710	159.5	3.82
11	s3g2|__YOB|s|pc	99.715	58484	0.12	711	103.9	15.40
12	_g2|dmYOB|s|pc	99.797	56031	0.14	712	88.2	3.17
13	s3g2|dmYOB|s|_	99.792	67743	0.17	713	80.7	5.74
14	s3g2|__YOB|_|pc	99.613	59012	0.23	714	51.9	30.52
15	_g2|dmYOB|_|pc	99.707	56541	0.27	715	44.0	6.28
16	s3g2|dmYOB|_|_	99.650	68327	0.29	716	44.9	10.23
17	s3g2|dm_ob|s|pc2	99.647	65447	0.34	717	36.9	10.16
18	s3_|dm_ob|s|pc	99.478	58319	0.41	718	28.9	8.84
19	s3_|dmYOB|s|pc2	99.583	65185	0.43	719	29.5	5.90
20	s3g2|dm_ob|_|pc2	99.496	66024	0.67	720	18.1	20.14
601	s3g2|dmYOB|s|pc	100.000	44977	0.00	. .	. .	0.00
602	s3g2|dmYOB|_|pc	99.998	45392	0.00	601	>1000	0.00
603	s3g2|dm_ob|s|pc	99.998	46105	0.00	601	>1000	0.01
604	s3g2|dmYOB|s|pc2	100.000	51170	0.00	601	>1000	0.00
605	s3_|dmYOB|s|pc	99.992	45855	0.00	601	>1000	0.00
606	s3g2|dm_ob|_|pc	99.998	46529	0.00	603	>1000	0.01
607	s3g2|dmYOB|_|pc2	99.998	51629	0.00	604	>1000	0.01
608	s3_|dmYOB|_|pc	99.992	46276	0.00	602	>1000	0.01
609	s3g2|dmYOB|s|st	100.000	53592	0.00	604	>1000	0.02
610	s3g2|dmYOB|_|st	99.998	54071	0.00	609	>1000	0.03
611	s3g2|__YOB|s|pc	99.976	47166	0.00	601	>1000	0.12
612	_g2|dmYOB|s|pc	99.978	45258	0.00	601	>1000	0.02
613	s3g2|dmYOB|s|_	100.000	53901	0.00	609	>1000	0.04
614	s3g2|__YOB|_|pc	99.962	47607	0.00	602	>1000	0.23
615	_g2|dmYOB|_|pc	99.976	45678	0.00	612	>1000	0.05
616	s3g2|dmYOB|_|_	99.998	54382	0.00	613	>1000	0.09
617	s3g2|dm_ob|s|pc2	99.994	52466	0.00	604	>1000	0.08
618	s3_|dm_ob|s|pc	99.986	47016	0.00	606	776.8	0.07
619	s3_|dmYOB|s|pc2	99.968	52178	0.00	604	>1000	0.05
620	s3g2|dm_ob|_|pc2	99.992	52936	0.00	617	772.5	0.16
621	s3_|dm_ob|_|pc	99.935	47445	0.00	618	649.9	0.13
622	s3_|dmYOB|_|pc2	99.938	52643	0.00	619	611.2	0.09
623	s3g2|dm_ob|s|st	99.971	54950	0.00	609	569.9	0.28
624	s3_|dmYOB|s|st	99.946	54654	0.01	609	353.9	0.16
625	s3g2|dm_ob|_|st	99.969	55442	0.01	623	199.4	0.55
626	s3g2|___ob|s|pc	99.942	48638	0.01	611	251.6	2.18

(continued)

Table C.3 (continued): Criteria for selecting match keys for PIAC Stage 3

Key	Linkage key	Joint. unique key rate (measure A)	[a]Est. number of links	Est. FMR (measure B)	[b]Comp-arison key	Marginal true: false (measure C)	[c]Est. 'worst case' FMR
627	s3_|dmYOB|_|st	99.946	55141	0.01	624	157.7	0.32
628	_g2|dm_ob|s|pc	99.971	46396	0.01	612	173.7	0.45
629	s3g2|__YOB|s|pc2	99.909	53717	0.01	604	367.5	1.48
630	s3_|__YOB|s|pc	99.950	48113	0.02	605	300.2	1.28
631	_g2|dmYOB|s|pc2	99.968	51490	0.02	612	825.8	0.30
632	__|dmYOB|s|pc	99.946	46390	0.02	612	137.2	0.26
633	s3g2|dm_ob|s|_	99.960	55271	0.02	623	42.6	0.83
634	s3g2|___ob|_|pc	99.821	49083	0.02	626	73.0	4.33
635	s3_|dmYOB|s|_	99.928	54969	0.02	624	33.2	0.48
636	_g2|dm_ob|_|pc	99.963	46825	0.03	615	87.1	0.90
637	s3g2|__YOB|_|pc2	99.889	54202	0.03	629	69.0	2.93
638	s3_|__YOB|_|pc	99.131	48494	0.03	630	49.7	2.54
639	_g2|dmYOB|_|pc2	99.966	51955	0.03	631	59.0	0.60
640	__|dmYOB|_|pc	99.905	46823	0.04	632	50.5	0.52
641	s3g2|dm_ob|_|_	99.956	55765	0.04	625	20.9	1.65
642	s3_|dmYOB|_|_	99.890	55458	0.04	627	16.2	0.96
643	s3_|dm_ob|s|pc2	99.950	53513	0.05	619	55.7	0.85
644	s3g2|__YOB|s|st	99.873	56264	0.10	609	46.8	10.44
645	_g2|dmYOB|s|st	99.926	53926	0.06	631	102.4	1.07
646	s3_|dm_ob|_|pc2	99.876	53988	0.09	622	27.6	1.68
647	s3g2|__YOB|_|st	99.850	56771	0.10	644	>1000	10.35
648	_g2|dmYOB|_|st	99.914	54412	0.12	645	14.5	2.13
649	_g2|__YOB|s|pc	99.833	47462	0.16	612	27.8	8.48
650	s3_|dm_ob|s|st	99.865	56058	0.18	624	13.8	3.00
651	s3g2|__YOB|s|_	99.749	56590	0.20	613	23.1	15.58
652	_g2|dmYOB|s|_	99.802	54239	0.23	645	2.3	3.21
653	_g2|__YOB|_|pc	99.783	47907	0.32	649	4.8	16.81
654	s3_|dm_ob|_|st	99.737	56555	0.35	627	6.4	5.95
655	s3g2|__YOB|_|_	99.696	57098	0.39	651	3.5	30.87
656	s3g2|___ob|s|pc2	99.708	55424	0.40	629	6.9	27.19
657	s3_|___ob|s|pc	99.516	48638	0.49	630	1.3	24.03
658	_g2|dmYOB|_|_	99.749	54727	0.46	648	0.7	6.35
659	_g2|dm_ob|s|pc2	99.762	52793	0.47	631	4.4	5.63
660	__|dm_ob|s|pc	99.621	47574	0.57	632	3.5	4.85
661	s3_|__YOB|s|pc2	99.491	54798	0.51	629	3.0	15.92
662	__|dmYOB|s|pc2	99.652	54045	0.57	631	7.5	3.18
653	s3_|dm_ob|s|_	99.612	56395	0.70	635	2.7	8.95
664	s3g2|___ob|_|pc2	99.507	55911	0.79	656	1.2	53.91
701	s3g2|dmYOB|s|pc	100.000	49060	0.00	. .	. .	0.00
702	s3g2|dmYOB|_|pc	99.984	49502	0.00	701	>1000	0.00
703	s3g2|dm_ob|s|pc	99.957	50305	0.00	701	>1000	0.04
704	s3g2|dmYOB|s|pc2	99.996	55840	0.00	701	>1000	0.03
705	s3_|dmYOB|s|pc	99.952	50034	0.00	701	>1000	0.02
706	s3g2|dm_ob|_|pc	99.957	50757	0.00	703	>1000	0.07
707	s3g2|dmYOB|_|pc2	99.977	56333	0.00	704	>1000	0.05

(continued)

Table C.3 (continued): Criteria for selecting match keys for PIAC Stage 3

Key	Linkage key	Joint. unique key rate (measure A)	[a]Est. number of links	Est. FMR (measure B)	[b]Comp-arison key	Marginal true: false (measure C)	[c]Est. 'worst case' FMR
708	s3_|dmYOB|_|pc	99.952	50486	0.00	702	>1000	0.04
709	s3g2|dmYOB|s|st	99.989	58515	0.00	704	>1000	0.09
710	s3g2|dmYOB|_|st	99.965	59029	0.00	709	>1000	0.18
711	s3g2|__YOB|s|pc	99.847	51479	0.00	701	>1000	0.70
712	_g2|dmYOB|s|pc	99.869	49369	0.00	701	152.5	0.14
713	s3g2|dmYOB|s|_	99.944	58836	0.01	709	144.2	0.26
714	s3g2|__YOB|_|pc	99.792	51951	0.01	702	679.1	1.39
715	_g2|dmYOB|_|pc	99.822	49816	0.01	712	220.5	0.29
716	s3g2|dmYOB|_|_	99.892	59352	0.01	713	174.0	0.52
717	s3g2|dm_ob|s|pc2	99.855	57266	0.01	704	251.2	0.46
718	s3_|dm_ob|s|pc	99.715	51314	0.01	706	91.6	0.40
719	s3_|dmYOB|s|pc2	99.803	56960	0.01	704	156.5	0.27
720	s3g2|dm_ob|_|pc2	99.796	57771	0.02	717	85.5	0.92
721	s3_|dm_ob|_|pc	99.439	51768	0.02	718	70.7	0.80
722	s3_|dmYOB|_|pc2	99.664	57462	0.03	719	67.8	0.54
723	s3g2|dm_ob|s|st	99.498	60008	0.04	709	64.3	1.64
724	s3_|dmYOB|s|st	99.373	59687	0.05	709	39.8	0.96
725	s3g2|dm_ob|_|st	99.302	60534	0.08	723	21.3	3.25
726	s3g2|___ob|s|pc	97.812	53048	0.11	711	27.0	12.90
727	s3_|dmYOB|_|st	99.373	60209	0.10	724	16.7	1.89
728	_g2|dm_ob|s|pc	97.447	50592	0.13	712	18.5	2.67
729	s3g2|__YOB|s|pc2	98.614	58619	0.11	704	40.9	8.71
730	s3_|__YOB|s|pc	97.447	52448	0.14	705	32.5	7.55
731	_g2|dmYOB|s|pc2	98.211	56141	0.13	712	92.5	1.79
732	__|dmYOB|s|pc	96.954	50577	0.16	712	14.3	1.55
733	s3g2|dm_ob|s|_	97.874	60336	0.16	725	3.6	4.90
734	s3g2|___ob|_|pc	96.848	53497	0.22	726	6.8	25.58
735	s3_|dmYOB|s|_	97.451	60014	0.20	724	2.7	2.85
736	_g2|dm_ob|_|pc	96.591	51031	0.25	715	8.7	5.29
737	s3g2|__YOB|_|pc2	98.172	59137	0.23	729	6.8	17.28
738	s3_|__YOB|_|pc	94.249	52722	0.27	730	2.8	15.03
739	_g2|dmYOB|_|pc2	97.611	56634	0.26	731	5.6	3.56
740	__|dmYOB|_|pc	94.810	51033	0.32	732	4.6	3.06
741	s3g2|dm_ob|_|_	97.126	60864	0.31	725	1.3	9.71
742	s3_|dmYOB|_|_	95.756	60539	0.39	727	0.9	5.65
743	s3_|dm_ob|s|pc2	96.663	58374	0.40	719	5.3	5.01
744	s3g2|__YOB|s|st	99.453	61421	0.88	709	4.4	61.61
745	_g2|dmYOB|s|st	99.363	58823	0.51	731	10.9	6.35
746	s3_|dm_ob|_|pc2	98.265	58811	0.79	722	2.0	9.95

(a) Estimated number of links was derived from simple deterministic matching on the key (retaining only one occurrence of duplicates).

(b) Comparative linkage key is one which is slightly more detailed and includes all the match key elements of the current key. There is not a strict hierarchy for the linkage keys, so in some cases there may be more than one appropriate key for the comparison.

(c) 'Worst case' FMR is estimated assuming that the number of categories within a key element is equal to that implied by the most common category (s3: 72, g2: 11, dmob: 182, yob: 19, s: 2, st: 3, pc2: 11, pc: 156, ACAP date: 161, ACAT id: 25).

Note: Shaded keys are those identified as not selected for use. See note to Table C.2 for definition of keys; '600' series include assessment date; '700' series linkage keys include assessment team identifier. Table only includes keys that were expected to have fewer than four times as many people with non-unique match keys as SLK-581. This equates to key 20 if client region is the only additional match data, key 64 if ACAP date and region are included and key 46 if assessment team identifier and region are included.

Phase 4: Stepwise matching using selected match keys

Using the selected match keys, stepwise linkage was then carried out, with order of use determined by the discriminating power of the keys (measure A, going from high to low). Variation in match key elements identified through previous stages was also incorporated into match steps where relevant. For Stage 3 this resulted in the use of 215 versions of the 115 selected match keys (Table C.4). All links identified by the selected match keys were accepted as valid, with the exception of duplicate matches. In this case, a match was selected at random.

Overall, 76,289 matches were identified in Stage 3: 60,780 using keys incorporating assessment date, a further 7,255 using keys with assessment team identifier, and 8,254 using keys which did not include assessment data (Table C.3). Under 600 matches (0.8%) were made using keys with an estimated 'worst case' FMR of more than 10% (just 15 matches with an estimated 'worst case' FMR of more than 20%).

Table C.4: Match results from stepwise matching for PIAC Stage 3

Step	Linkage key	Matches	Step	Linkage key	Matches	Step	Linkage key	Matches
1	key_601	45,031	73	key_632	252	145	key_717_2	—
2	key_601_2	904	74	key_626	313	146	key_717_3	—
3	key_601_3	1,357	75	key_621	1	147	key_717_4	—
4	key_601_4	26	76	key_622	—	148	key_711	220
5	key_604	5,151	77	key_635	3	149	key_711_2	2
6	key_604_2	99	78	key_635_2	—	150	key_711_3	15
7	key_604_3	—	79	key_645	14	151	key_711_4	2
8	key_604_4	146	80	key_645_2	—	152	key_715	1
9	key_609	2,027	81	key_648	1	153	key_719	18
10	key_609_2	28	82	key_629	258	154	key_719_2	—
11	key_613	257	83	key_629_2	2	155	key_719_3	1
12	key_613_2	3	84	key_629_3	10	156	key_719_4	—
13	key_602	383	85	key_629_4	—	157	key_720	—
14	key_602_2	13	86	key_640	9	158	key_714	6
15	key_602_3	4	87	key_642	1	159	key_718	4
16	key_602_4	—	88	key_637	1	160	key_722	1
17	key_603	883	89	key_646	1	161	key_723	5
18	key_603_2	12	90	key_644	86	162	key_723_2	—
19	key_603_3	19	91	key_644_2	4	163	key_721	1
20	key_603_4	1	92	key_650	8	164	key_724	3
21	key_606	8	93	key_647	1	165	key_724_2	—
22	key_607	36	94	key_649	17	166	key_727	—
23	key_607_2	—	95	key_634	8	167	key_725	—
24	key_607_3	3	96	key_652	7	168	key_729	32
25	key_607_4	—	97	key_652_2	—	169	key_729_2	—
26	key_610	15	98	key_653	—	170	key_729_3	3
27	key_610_2	—	99	key_659	11	171	key_729_4	—
28	key_616	1	100	key_651	15	172	key_731	10
29	key_616_2	—	101	key_651_2	1	173	key_731_2	—
30	key_617	113	102	key_654	4	174	key_731_3	—
31	key_617_2	2	103	key_656	70	175	key_731_4	—
32	key_617_3	6	104	key_655	—	176	key_737	3
33	key_617_4	—	105	key_638	3	177	key_733	—

(continued)

Table C.4 (continued): Match results from stepwise matching for PIAC Stage 3

Step	Linkage key	Matches	Step	Linkage key	Matches	Step	Linkage key	Matches
34	key_605	725	106	key_701	5,176	178	key_733_2	—
35	key_605_2	22	107	key_701_2	111	179	key_726	63
36	key_605_3	30	108	key_701_3	173	180	key_739	3
37	key_605_4	1	109	key_701_4	8	181	key_735	—
38	key_608	6	110	key_704	654	182	key_735_2	—
39	key_620	2	111	key_704_2	16	183	key_728	23
40	key_618	30	112	key_704_3	—	184	key_730	23
41	key_612	227	113	key_704_4	18	185	key_732	37
42	key_612_2	1	114	key_709	237	186	key_734	8
43	key_612_3	7	115	key_709_2	2	187	key_743	21
44	key_612_4	—	116	key_702	30	188	key_736	3
45	key_611	1,697	117	key_702_2	—	189	key_01	5,271
46	key_611_2	13	118	key_702_3	1	190	key_01_2	107
47	key_611_3	52	119	key_702_4	—	191	key_01_3	497
48	key_611_4	1	120	key_707	6	192	key_01_4	18
49	key_615	3	121	key_707_2	—	193	key_04	784
50	key_623	53	122	key_707_3	—	194	key_04_2	12
51	key_623_2	—	123	key_707_4	—	195	key_04_3	29
52	key_628	10	124	key_710	2	196	key_04_4	1
53	key_625	2	125	key_710_2	—	197	key_09	435
54	key_619	100	126	key_703	113	198	key_09_2	5
55	key_619_2	4	127	key_703_2	—	199	key_02	41
56	key_619_3	3	128	key_703_3	2	200	key_07	10
57	key_619_4	—	129	key_703_4	—	201	key_10	8
58	key_631	34	130	key_706	1	202	key_05	164
59	key_631_2	—	131	key_705	105	203	key_08	6
60	key_631_3	1	132	key_705_2	3	204	key_03	120
61	key_631_4	1	133	key_705_3	1	205	key_06	2
62	key_639	—	134	key_705_4	—	206	key_12	68
63	key_636	—	135	key_708	1	207	key_13	153
64	key_614	14	136	key_713	36	208	key_13_2	4
65	key_633	10	137	key_713_2	—	209	key_11	319
66	key_633_2	—	138	key_716	—	210	key_15	14
67	key_641	—	139	key_716_2	—	211	key_16	7
68	key_630	50	140	key_712	34	212	key_17	65
69	key_643	8	141	key_712_2	—	213	key_14	7
70	key_624	42	142	key_712_3	3	214	key_19	68
71	key_624_2	—	143	key_712_4	—	215	key_18	39
72	key_627	2	144	key_717	14			
Matches with ACAT date (steps 1-105)								60,780
Matches with ACAT id (steps 106-188)								7,255
Other matches (steps 189-215)								8,254
Total matches								**76,289**

Legend for linkage key suffixes:

No suffix linkage used preferred RCCP SLK-581 and preferred postcode

_2 linkage used alternative RCCP SLK-581 and preferred postcode

_3 linkage used preferred RCCP SLK-581 and alternative postcode

_4 linkage used alternative RCCP SLK-581 and alternative postcode

Note: See Table A2 for definition of keys. Order of use is based on the joint unique key rate in Table A2. '600' series linkage keys use assessment date, '700' series linkage keys include the assessment team identifier.

C.3 Results

Match rates between data set pairs varied considerably across the seven stages, ranging from just over 3% to 73% (Table C.5). Not all match keys identify links, and the number of keys used to identify matches (from among all those employed) depended both on the data sets being matched and the availability of data for matching in addition to SLK-581. Across all stages this number ranged from 12 to 160 keys (Table C.5).

Using auxiliary information in the linkage increased the match rate significantly. The proportion of links that had matching SLK-581s varied depending on the data sets being matched and the additional data available, from 90% (as in Stage 3) to just over 97% (Table C.6). Furthermore, between 1.1% and 2.3% of links were between records with incomplete SLK-581 information on 'data set 1' in Table C.6. Matches made using previously-identified variations in SLK-581 varied from 0.5% to almost 6% (Table C.6).

Data on region of residence were critical in identifying matches: Overall, 96% or more of matches at all stages could have been made by match keys which only used components of SLK-581 and region of residence. This result reflects the high availability of this data, the strong discriminating power of residence in small regions and the relatively low availability of event data in some of the data sets being compared.

Having event data in conjunction with region data to aid the matching did not necessarily lead to relatively high match rates. For stages which included event data in the matching, the proportion of links that had matching SLK-581s ranged from 90.0% (Stage 2) to 96.9% (Stage 7); for other stages this proportion varied between 90.4% (Stage 4) and 97.4% (Stage 5) (Table C.6).

Table C.5: Overview of matching in the PIAC study, by linkage stage

Stage	1	2	3	4	5	6a	6b	6c	6d	7
Data set 1	RAC/EACH 2002-06	NDI July 03-Dec 06	ACAP 2003-04	NDI unlinked July 03-Dec 06	ACAP 2003-04	ACAP 2003-04	ACAP 2003-04	ACAP 2003-04	ACAP 2003-04	ACAP 2003-04 (with links)
Data set 2	CACP 2002-06	RAC/EACH/CACP 2002-06	RAC/EACH/CACP 2002-06	ACAP 2003-04 unlinked	ACAP 2004-05	HACC 2002-03	HACC 2003-04	HACC 2004-05	HACC 2005-06	VHC
Data set size										
Data set 1	373183	470121	105077	299879	105077	105077	105077	105077	105077	105077
Data set 2	80028	415057	415057	28788	141911	615642	675446	710781	705261	164192
Match keys										
Additional match variables	● ur community region	● last ur region ● date of death	● 2003-04 ur community region ● 2003-04 RAC ur ● ACAP date ● ACAT id	● ur region	● ur region	● ur region	● ur region	● ur region	● ur region	● ur region ● date of death
Variation allowed in match keys	S3, G2, sex, yob, dmob (only separately) if have pc	S3, G2, sex, yob, dmob, in combinations if have dod and pc	S3, G2, sex, yob, dmob, in combinations if have assessment information and pc	S3, sex, yob, dmob (only separately) if have pc	S3, G2, sex, yob, dmob (only separately) if have pc	S3, G2, sex, yob, (only separately) if have pc	S3, G2, sex, yob, (only separately) if have pc	S3, G2, sex, yob, (only separately) if have pc	S3, G2, sex, yob, (only separately) if have pc	S3, G2, sex, yob, dmob, in combinations if have dod and pc
Number of keys used in linkage (with variations(a))	16	47 (128)	115 (215)	12	17 (50)	12 (57)	12 (57)	12 (57)	12 (57)	75 (208)
Number of keys making matches, with variations(a)	16	64	160	12	40	16	29	27	12	40
Total matches	38154	170242	76289	9983	32443	48604	61447	41483	27500	12827
Match rate(b)										
Data set 1	10.2	36.2	72.6	3.3	30.9	46.3	58.5	39.5	26.2	12.2
Data set 2	47.7	41.0	18.4	34.7	22.9	7.9	9.1	6.0	3.9	7.8

(a) Includes keys using alternative SLK-581 or postcode information obtained through previous linkage stages, where available.

(b) Denominator in the match rate includes people in regions not included in the ACAP NMDS version 2. These regions, covering all of Queensland and the areas of New South Wales assessed by 14 out of the 50 ACATs operating in New South Wales, accounted for 30% of all assessments in 2003-04. Consequently, match rates understate the use of ACAP by people using the other service. For ACAP 2004-05, the proportion of assessments not included in Version 2 dropped to 15%.

Note: Table includes people of all ages using services.

Table C.6: Overview of link quality in the PIAC study, by linkage stage

Stage	1	2	3	4	5	6a	6b	6c	6d	7
Data set 1	RAC/ EACH(D) 2002-06	NDI July 03-Dec 06	ACAP 2003–04	NDI unlinked July 03-Dec 06	ACAP 2003–04	ACAP 2003–04	ACAP 2003–04	ACAP 2003–04	ACAP 2003–04	ACAP 2003–04
Data set 2	CACP 2002-06	RCCP 2002-06	RCCP 2002-06	ACAP 2003–04 unlinked	ACAP 2004–05	HACC 2002-03	HACC 2003–04	HACC 2004–05	HACC 2005–06	VHC up to Feb. 2008
Matches										
To cases with duplicate match key on either data set (max %)	0.01	0.04	0.01	0.10	0.02	0.08	0.08	0.10	0.12	0
To match keys using identified SLK-581 variations (%links)	n.a.	[a]0.3	[a]2.1	n.a.	2.4	4.4	3.8	3.7	3.3	5.8
To match keys using identified postcode variations (% links)	n.a.	1.3	2.9	n.a.	0.7	0.5	0.4	0.7	1.1	13.7
Matches made requiring stage-specific data[a] (%)	n.a.	4.1	2.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.5
Using first (most detailed) match key (%)	74.6	43.8	59.0	65.1	84.0	72.8	79.0	80.4	75.8	27.4
Match on SLK-581[b] (%)	92.4	90.0	90.2	90.4	97.4	94.0	94.9	93.9	91.6	96.9
With 'complete' SLK-581 in data set 1[c]	98.7	97.7	98.3	98.5	98.5	98.8	98.7	98.7	98.6	98.9
With discriminating power ε (0.9985, 1.0]	100.0	99.5	99.6	100.0	99.3	94.0	94.9	93.9	91.6	100.0

(a) Includes event dates and non-region data

(b) Includes cases with identified SLK-581 and/or postcode variations.

(c) A 'complete' SLK-581 had no missing data and a date of birth not based on 1 January or 1 July.

Note: Table includes people of all ages using services.

C.4 Validation

The quality of the linkage depends both on the quality of the data used to establish matches and on the ability of these data to distinguish between individuals. In the results below, the quality of the data used in the linkage is examined. Measures of link quality are then examined, both through match characteristics and validation checks.

Quality of match data

The presence of missing data reduces the likelihood of identifying true matches. The number of missed matches will also be relatively high if there are unreliable data on one of the data sets. However, if both data sets being matched have similar processes for recording poor information (e.g. recording dates of birth as 1 January of the year derived from current age) then the likelihood of making false matches increases.

Reliable SLK-581 data were available for over 94% of client records for all data sets in the study (counting 1 January and 1 July dates of birth as possibly unreliable) (Table C.7). The NMDSs tended to have less reliable SLK-581 data (94%–98% reliable) than the administrative data sets (>97.6%). Poor date of birth data were more common than missing name or sex data. The variability of data quality over time even within data collections is illustrated by the ACAP and HACC NMDS data.

In all data sets, over 99% of client records with both complete name data and date of birth data (not 1 January) had a unique SLK-581 (Table C.7). This result for data sets with administratively-derived client identifiers indicates once again that SLK-581 distinguishes well between individuals when complete data are available.

The availability of additional data (i.e. other than SLK-581) varied depending on the data set and data item (Table C.7). For example, for Stage 3, less than 2% of records had missing postcode in either data set. ACAP assessment date and team data were available for all clients on the 2003–04 ACAP NMDS. On the other hand, many RCCP clients did not have an ACAP assessment in 2003-04, and so these data were available for just 27% of all RCCP clients.

Table C.7: Quality of data used to establish links in the PIAC study

	RAC/EACH(D) 2002–06	CACP 2002–06	NDI 1 July 2003 – 31 Dec 2006	[a]ACAP 2003–04	[a]ACAP 2004–05	[b]Annual HACC 2002–06	VHC (2001–07)
Complete SLK-581	99.04	98.30	97.69	97.86	96.58	94.36-95.51	99.36
SLK-581 with possibly poor dob only							
SLK-581 with 1 Jan. dob[c]	0.54	0.96	0.46	0.90	0.82	2.90-3.43	0.36
SLK-581 with 1 July dob[c]	0.42	0.72	0.35	0.54	0.53	0.45-0.46	0.28
SLK-581 with inconsistent with reported age at death[d]	. .	.	1.34	. .	. .	. .	. .
SLK-581 with missing dob	0.00	0.00	0.13	0.01	0.25	0.00-0.01	0.00
Subtotal	*0.96*	*1.68*	*2.28*	*1.45*	*1.60*	*3.37-3.89*	*0.64*
SLK-581 with some missing name and/or sex							
Name and/or sex only	0.00	0.01	0.03	0.69	[e]1.82	0.49-2.12	0.00
With 1 Jan. dob	0.00	0.00	0.01	0.01	0.01	0.00-0.14	0.00
Subtotal	*0.00*	*0.01*	*0.04*	*0.70*	*1.83*	*0.62-2.12*	*0.00*
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**
Total clients	**373,183**	**80,028**	**470,121**	**105,077**	**141,911**	**615,642–710,781**	**164,198**
Unique SLK-581 (excluding cases missing name sex, or with 1 Jan. dob)	99.89	99.97	99.64	99.89	99.80	99.41-99.48	99.88
Usual residence postcode available	99.49	99.23	87.53	98.18	98.83	97.17-99.28	99.16
– in permanent RAC some time in 2003–04	50.94	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Date of death	47.19	13.06	99.96	n.a.	n.a.	n.a.	36.57
ACAT date 2003–04	27.38	26.75	n.a.	100.00	n.a.	n.a.	n.a.
ACAT id 2003–04	27.38	26.75	n.a.	100.00	n.a.	n.a.	n.a.

(a) About one-quarter of indigenous ACAP clients had estimated dates of birth, compared with 2% of clients from a culturally and linguistically diverse (CALD) background and only 1% of all non-indigenous clients.

(b) Clients who only received services targeting carers and/or case management/assessment services were excluded from the HACC data sets. HACC measures were based on clients aged 50+.

(c) As a rough guide, compare with 1/365 = 0.27%.

(d) An NDI record is said to have an inconsistent date of birth if date of birth and date of death are not consistent with reported age at death (within 1 year).

(e) All cases with missing letters of name in the ACAP data set were from 5 ACAT teams new to NMDS version 2 whose software did not allow them to extract letter of name.

Match characteristics

The main purpose of a match key is to establish links. However, a close look at the list of keys used for Stage 3 (Table C.3) suggests that many of the keys may be redundant; that is,

less discriminating keys would have established links identified by several more specific keys. This apparent redundancy was purposefully retained for two reasons. First, the role of many of the keys was to obviate the need to choose between records for clients with non-unique linkage information, thereby improving match quality. Across all stages, 0.12% or fewer matches were made between clients with non-unique match information for the identifying match key on either data set.

The second reason for the multiplicity of keys is to show the strength of identified matches. Over 99% of matches were made using match keys with *discriminating power* of more than 99.85, except for Stage 6 (Table C.6). For Stage 6 (matching ACAP and HACC NMDSs), over 91% of links were made using keys with this high level of uniqueness. The lower proportions in this stage resulted from the combined effect of having no event data to aid matching and the large size of the HACC data sets. The proportion of matches made with the most detailed (i.e. first) match key depended on the prevalence of the additional information in the data sets, and ranged from 27% to 84%.

Missing components of SLK-581 appear to have resulted in missed links when region was the only data element available for matching in addition to SLK-581. This particularly affected matching between NMDS data sets: for stages 5 and 6, relatively few links were made with records with incomplete SLK-581s: less than 2% of matches had possibly poor SLK-581 data compared with rates of 3-6% of records with poor SLK data in the original data sets (tables C.6 and C.7). Previous analysis of the HACC NMDS showed that 'clients' defined by an SLK-581 with some missing data tended to have fewer care episodes recorded against them than other clients (AIHW: Karmel 2005a). This suggests that some of those with missing SLK data could also have records associated with another SLK. In this case, the poor SLK data would result in missing periods of service use in the care pathway rather than total absence of use of a program.

Link validation

Two main methods were used to validate links: consistency of links with record characteristics and clerical review of three samples of links.

Consistency of matches

The consistency of links was examined looking particularly at links within ACAP place of assessment and links to deaths (Table C.8). For Stage 3, 97.6% of ACAP 2003–04 clients who were reported as being assessed in RAC linked to the RCCP data set. More generally, links to deaths were highly consistent, both with respect to different sources of date of death information and with regards to program links to ACAP. Overall, very few of the PIAC cohort (0.16%) had a link to a death record that was inconsistent with other elements in the identified care pathway; that is, almost all the NDI records linked to the ACAP cohort had a date of death after identified program use.

Table C.8: Measures of link consistency

Measure	Numerator	Denominator	Per cent
RCCP reported reason for last discharge			
'Death': per cent linked to NDI	140,666	143,244	98.2
'To hospital': per cent linked to NDI	4,782	8,245	58.0
'Return to family or home': per cent linked to NDI	6,833	28,352	24.1
RCCP reported still in care on 30 June 2006			
Per cent linked to a death after 30 June 2006	12,574	172,247	7.3
Per cent linked to a death before 30 June 2006	313	172,247	0.2
ACAP assessment reported as taking place in RAC			
Per cent linked to RCCP	7,132	7,308	97.6
ACAP 2003–04 cohort linked to NDI death record and linked to VHC record			
Dates of death on both data sets within 7 days	6,215	6,250	99.4
NDI date of death only (on linked ACAP cohort)	23	6250	0.4
VHC record linked to ACAP cohort			
Date of death before 31 December 2006 and death only on VHC data: per cent links	148	12827	1.2
Inconsistent links to ACAP cohort[(a)]			
ACAP cohort pathway with linking to inconsistent death: death before service provision	184	105,077	0.18
HACC care reported after linked death	895	105,077	0.85

(a) Because of limitations in data on dates of service provision for HACC dependent services, results for linking to HACC are presented separately.

Clerical verification

As permitted under the ethics approvals, link quality was explicitly investigated using the name information available on the NDI and RCCP data sets to clerically review identified links. Lack of full name on the ACAP NMDS prevented this data set from being used in the comparisons.

Three samples of around 1,000 NDI–RCCP links were randomly selected and the full name, date of birth, sex, postcode and event data from the two data sources were compared clerically across the linked records to identify false positives. Examination of the random sample of 1,010 links taken from all 170,242 NDI–RCCP links identified just one wrong link (false positive) between the two data sets and a further seven with substantial first name differences but which were highly likely to be true positives (Table C.9). Another sample of 1,000 was selected from among the 16,128 links in which the matched records had differences in their SLK-581s (NDI versus RAC). In this sample, differences in sex (34% of sample) and date of birth (63%) were the main causes of the SLK-581 differences, with name differences (including spelling mistakes) affecting around 10%. Because of the SLK differences, these links were expected to be of lower quality; however, just five were identified as false positives (0.5%). Looking at a final sample of 1,000 links out of 26,741 in which date of death data had not been used in the linkage (i.e. reason for discharge on RCCP was not due to death), no false positives were found.

Table C.9: Link verification: samples estimating false positives between RCCP and NDI (stage 2)

	Sample from		
Link comparison result	**NDI–RCCP links without identified DOD on ACCMIS**	**NDI–RCCP links with SLK-581 differences**	**All NDI–RCCP links**
Same person	1,000	987	1,009
Highly likely to be same person			
Switched given names	0	4	5
Different given names, same dob and dod	0	4	2
Total	*0*	*8*	*7*
Wrong	0	5	1
Total sample	**1,000**	**1,000**	**1,010**
Link population	**26,741**	**16,128**	**170,242**

Note: Samples were selected randomly using a random number generator. Minor name differences (i.e. due to spelling) are not recorded in this table.

C.5 Conclusion

The above results show that there can be considerable variation in recorded name and date of birth information, depending on the setting and reason for reporting. Allowing for this in the matching strategy is therefore important. The stepwise deterministic matching algorithm developed for the PIAC project allows for this variation and results in matches of good quality.

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