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The Australian National Aged Care Classification (AN-ACC). The Resource Utilisation and Classification Study: Report 1

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The Australian National Aged Care Classification (AN-ACC). The Resource Utilisation and Classification Study: Report 1

Abstract
The Australian Health Services Research Institute (AHSRI), University of Wollongong, was commissioned by the Commonwealth Department of Health (the Department) in August 2017 to undertake the 'Resource Utilisation and Classification Study' (RUCS). This is the first of a series of reports that will present the results of the body of work completed as part of the overall RUCS program. This report (Report 1) presents the recommended classification, known as the Australian National Aged Care Classification (AN-ACC). The key elements of the AN-ACC development process, including the sampling methodology, clinical stakeholder consultations, and the data collection and analysis methods are outlined. The final section of this report discusses key classification-related issues that will be critical to the successful implementation of the AN-ACC across the Australian residential aged care sector.

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The Australian National Aged Care Classification (AN-ACC)

The Resource Utilisation and Classification Study: Report 1

February 2019

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This series of papers report on different aspects of a major national study into needs, costs and classification of residential aged care called the Resource Utilisation and Classification Study (RUCS). The RUCS was undertaken during 2018.

This report (Report 1) presents the recommended classification known as the Australian National Aged Care Classification (AN-ACC).

A summary of all the reports associated with RUCS is provided in Appendix 1.

Report 1: **The Australian National Aged Care Classification (AN-ACC)** (this report)

Report 2: The AN-ACC assessment model

Report 3: Structural and individual costs of residential aged care services in Australia

Report 4: Modelling the impact of the AN-ACC in Australia

Report 5: AN-ACC: A funding model for the residential aged care sector

Report 6: AN-ACC: A national classification and funding model for residential aged care: synthesis and consolidated recommendations

Report 7: AN-ACC Technical appendices

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Abbreviations

ACFI	Aged Care Funding Instrument
ADL	Activities of Daily Living
AHSRI	Australian Health Services Research Institute
AKPS	Australia-modified Karnofsky Performance Status
AM-FIM	Australian Modified Functional Independence Measure
AN-ACC	Australian National Aged Care Classification
BRUA	Behaviour Resource Utilisation Assessment
CART	Classification and Regression Trees
CV	Coefficient of variation
DEMMI	De Morton Mobility Index
the Department	Commonwealth Department of Health
FIM	Functional Independence Measure
NPI-NH	Neuropsychiatric Inventory – Nursing Home
RIV	Reduction in Variation
RUCS	Resource Utilisation and Classification Study
RUG-ADL	Resource Utilisation Groups – Activities of Daily Living
RVU	Relative Value Unit

Glossary of Terms

Aged Care Funding Instrument (ACFI)	The existing resource allocation instrument used to determine care subsidies in Australian residential aged care.
Casemix	A system that allocates service recipients into classes. Care recipients within a class will have similar clinical attributes and their care will involve similar levels of resource consumption.
Coefficient of variation (CV)	A statistical measure of homogeneity within a group. This is calculated as the standard deviation divided by the mean and in casemix systems is usually measured for care costs or care time. A low CV is a measure of good homogeneity within a class.
Consumer Directed Care	A model of service delivery designed to give more choice and flexibility to consumers, providing consumers with more control over the types of care and services they access.
Individual care	Care that is tailored to the needs of an individual resident. Differences in individual care time between residents are likely to be associated with differences in assessed function, cognition, behaviour and health status.
Permanent resident	A person who enters residential aged care as their ongoing place of residence.
Relative Value Unit (RVU)	In the context of this study, a measure of relative resource consumption (staff time or dollars). An RVU of 1.2 means that the cost is 20% above the national average. An RVU of 0.5 means that the cost is 50% below national average.
Residential aged care	Personal and/or nursing care that is provided to a person in a residential aged care service. In addition to care, the person is also provided with accommodation that includes meals, cleaning services, furniture and equipment. The residential aged care service must meet certain building standards and appropriate staffing in supplying the provision of that care and accommodation.
Respite care	Short term care for a person within a residential care facility for short periods of time on a once-off or regular basis. The main purpose of respite is to provide relief for the usual carer.
Shared care	Care that is not tailored to individual resident needs and that all residents generally benefit from equally. This includes activities such as general supervision in common areas, night supervision, clinical care management and quality activities, and incidental brief interactions with residents.

Key Messages

- This report presents key results from 'Study One' of the Resource Utilisation and Classification Study (RUCS).
- This study is part of a broader reform process to design a new funding model for residential aged care.
- The primary aim of Study One was to develop a new, fit-for-purpose casemix classification for the Australian residential aged care sector.
- 30 facilities in three regions participated in a study that involved 1,877 resident assessments and 315,029 staff time activity records collected by 1,600 staff.
- The clinical profile of study residents supports the hypothesis that residential aged care costs are driven by care burden associated with end of life needs, frailty, mobility, functional decline, cognition, behaviour and technical nursing needs.
- A casemix classification, the Australian National Aged Care Classification (AN-ACC) has been developed. AN-ACC Version 1.0 comprises 13 classes and explains 50% of the variance in the cost of individual resident care. There is a fivefold variation in cost between the least and most expensive AN-ACC class.
- AN-ACC is underpinned by a clinical assessment instrument that can be completed by an external clinical assessor.
- The staff time data collection found that close to 50% of staff time was spent delivering care tailored to the specific needs of the resident, while the remaining 50% was spent delivering shared care across all residents.
- The statistical and clinical performance of AN-ACC is considered more than sufficient for it to be adopted in a funding context.
- The staff time data collection analysis supports a payment model that includes a fixed per diem price for the costs of shared care and a variable price per day for the costs of individual resident care.
- Ongoing work will be required to ensure the classification continues to reflect emerging practices and cost structures.
- There are important opportunities to measure and understand quality and outcomes beyond a funding model context that arise from the development of AN-ACC.

1 Introduction and background to RUCS

The Australian Health Services Research Institute (AHSRI), University of Wollongong, was commissioned by the Commonwealth Department of Health (the Department) in August 2017 to undertake the 'Resource Utilisation and Classification Study' (RUCS). This is the first of a series of reports that will present the results of the body of work completed as part of the overall RUCS program.

This report (Report 1) presents the recommended classification, known as the Australian National Aged Care Classification (AN-ACC). The key elements of the AN-ACC development process, including the sampling methodology, clinical stakeholder consultations, and the data collection and analysis methods are outlined. The final section of this report discusses key classification-related issues that will be critical to the successful implementation of the AN-ACC across the Australian residential aged care sector.

1.1 Aims and objectives

The RUCS is an important national study commissioned by the Department to inform the development of future funding models for residential aged care in Australia. The overall aim of the RUCS was to:

- Identify the clinical and need characteristics of aged care residents that influence the cost of care (cost drivers).
- Identify the proportion of care costs that, on average, are shared across residents (shared costs) relative to those costs related to individual needs (individual costs).
- Develop a casemix classification based on identified cost drivers that can underpin a funding model that recognises both shared and individual costs.
- Test the feasibility of implementing the recommended classification and funding model across the Australian residential aged care sector.

1.2 Background and context

The current system for funding residential aged care services using the Aged Care Funding Instrument (ACFI) has been in place for over a decade. Since its introduction, there have been substantial changes in the profile of people entering residential care, partly due to the success of programs to enable them to stay at home as long as possible. Residents are older (half are aged 85 and over on entry) and frailer, with an annual mortality rate of around 32%. Reflecting this profile, half of those entering residential care will be there for two years or less.

The Department and providers have both experienced issues of funding uncertainty, instability and inequity in recent years. In late 2016, the Department commissioned AHSRI to undertake a review and develop options and recommendations for future funding models to

be adopted for the residential aged care in Australia.[1] A key finding of this review was that, as a result of the changing profile of residents, the ACFI no longer satisfactorily discriminates between residents in terms of what drives the costs of delivering care.

Five options for reform were identified in this study. Each option was evaluated against a set of criteria that addressed the key issues identified for the sector. One of the five options (the recommended option) was to develop a blended payment model, consisting of a payment for fixed costs and variable payments linked to the individualised needs of each resident. It was recognised that, while this option would have significant short term impacts on workforce and aged care system infrastructure, it would deliver benefits that far outweigh the short term resourcing concerns.

Following consideration of the report's recommendations, the Department subsequently commissioned the RUCS to be undertaken by AHSRI.

1.2.1 Key principles underpinning the design of RUCS

The following key design elements were established to underpin the implementation of RUCS:

- Resident assessment for funding to be separate from resident assessment for care planning purposes.
- Assessment for funding purposes to be undertaken by external assessors capturing only the information necessary to assign a resident to a payment class.
- Assessment related to care planning to be undertaken by the residential aged care facility based on resident needs and underpinned by Consumer Directed Care principles.
- The provision of a one-off adjustment payment for each new resident recognising additional, but time-limited, resource requirements when someone initially enters residential care.
- A fixed per diem price for the costs of care that are shared equally by all residents (which may vary by location and other factors).
- A standardised variable price per day for the costs of individualised care for each resident based on each resident's casemix class.

In considering the results and recommendations included in this report, it is necessary to distinguish between three key ideas:

Cost

The cost of care for people living in residential aged care is in scope for RUCS. Capital accommodation and 'hotel' services are out of scope, as is respite care for non-permanent residents.

[1] McNamee J, Poulos C, Seraji H et al. (2017) *Alternative Aged Care Assessment, Classification System and Funding Models Final Report.* Centre for Health Service Development, Australian Health Services Research Institute, University of Wollongong.

Funding (payment) model and policy

Funding and payment issues are in scope. The role of the RUCS research team is to develop the funding model and provide policy advice on its potential implementation.

Price

Price is out of scope for RUCS as price is ultimately a decision for payers (both government and consumers). But the RUCS has generated significant evidence that can aid decision-making about pricing.

1.3 A brief overview

In summary, RUCS comprised four separate but closely related studies. Each study included separate data collection and analysis elements that have been synthesised to produce a classification and associated funding model that is suitable for implementation across the Australian residential aged care sector.

Study One - Service utilisation and classification development study

Study One involved a prospective and comprehensive collection of resident assessment, service utilisation and financial data which were analysed to develop a casemix classification. It involved 30 facilities clustered in three geographic regions in Queensland, New South Wales and Victoria.

Study One was completed between October 2017 and October 2018.

Study Two - Fixed and variable cost analysis study

Study Two involved a larger sample of 110 facilities. The purpose of this study was to understand differences in cost drivers between different types of facilities (including facility size and location) as well as differences that may result from seasonal effects. This analysis was to inform the design of the funding model. Study Two examined facility (rather than resident level) costs from a nationally representative sample of facilities across Australia.

Study Two was completed between November 2017 and October 2018.

Study Three - Casemix profiling study

Study Three involved the collection of variables included in the classification from an additional nationally representative sample of 80 facilities. The primary purpose of Study Three was to develop a national casemix profile of residents in aged care in Australia.

Study Three was completed between September 2018 and December 2018.

Study Four – Reassessment study

Study Four was added to the RUCS work program in mid-2018 in recognition of value that could be added by collecting additional information about the rate and extent of change in residents' care needs over time. Study Four involved conducting re-assessments of approximately 1,000 residents assessed as part of Study One four to six months after their initial assessment.

Study Four was completed between August 2018 and December 2018

1.4 Ethical approval

Ethical approval for all components of the RUCS was granted prior to its commencement by the University of Wollongong and Illawarra Shoalhaven Local Health District Health and Medical Human Research Ethics Committee (approval date 21/02/2018, Ethics Number 2017/546).

2 The RUCS Service Utilisation and Classification Development Study (Study One) – Study Design

The primary aim of the service utilisation and classification development study (Study One) was to develop a new, fit-for-purpose classification for the Australian residential aged care sector. The study design recognised that the classification would need to address the limitations of the current funding model, including that:

- The additive design ignores the interactions between concurrent problems experienced by residents.
- It does not focus on what drives costs of care.
- There is insufficient discrimination between residents with different care needs with one third of residents classified to just one payment class.
- It is prescriptive in the types of care activities that are funded, leading to a focus on delivering those activities.

The remainder of this section provides a brief overview and outlines the key design issues addressed in the RUCS service utilisation and classification development study (Study One).

2.1 Study One – Overview

The design work associated with Study One was completed between August 2017 and February 2018. In order to support the explicit deliverables required of Study One, the design parameters were deliberately very specific, namely:

- Resident assessments were designed to capture only those items that relate to the resources required to deliver care. That is, these were assessments for funding and not for care planning purposes.
- Service utilisation data captured related only to individual care time and did not seek to capture data on all care provided.
- The financial data captured did not include the total cost of operations for each facility - only the costs of delivering care to residents.

It was established at the outset of the study that a 'branching' classification would most accurately reflect the current clinical and cost profile of aged care residents. The design of Study One therefore focussed on ensuring that the final study dataset would support the development from first principles of a clinically contemporary branching classification.

This objective was achieved through a comprehensive prospective collection of service utilisation, resident assessments and financial data from 30 residential aged care facilities in three geographical regions.

The service utilisation data collection occurred over a four week period between March 2018 and June 2018. During this time, staff involved in delivering care to residents recorded the amount of time spent undertaking different types of activities during each shift. Purpose-designed bar-coding technology was provided to facilitate this data collection.

The second element of the data collection involved a clinical assessment of residents in the 30 participating facilities (refer Appendix 2). A resident assessment tool was purpose-designed for the study with the support of four expert clinical advisory panels, to capture levels of care burden associated with function, cognition, communication, behaviour and other factors. The resident assessment tool used in Study One was completed by qualified aged care clinicians during the service utilisation data collection period.

The final element of the data collection involved capturing expenditure data from each facility corresponding to the service utilisation period. In the classification development process, protocols were applied to include or exclude expenditure based on its relevance to the delivery of in-scope care.

Following completion of all data collection, an iterative series of statistical analyses and clinical review was undertaken and a draft classification developed. This was formally reviewed by the study's clinical panel and endorsed in September 2018. The endorsed classification has been named the Australian National Aged Care Classification (AN-ACC).

2.2 Sampling

The population of interest in Study One were residents in non-government residential aged care facilities in Australia. A stratified two-stage cluster sampling method was adopted. Cluster sampling is a sampling approach used when a population can be divided into groups that are mutually homogeneous and internally heterogeneous. A benefit of clustered sampling is that it supports centralised training and coordination of data collection to ensure high quality data. Cluster samples can be further stratified to ensure that important characteristics are adequately represented within the sample.

The first stage of clustering occurred at the Australian Standard Geographical Classification by Remoteness Area level. Clusters were stratified into three region types; major cities ('Major cities of Australia'), regional areas ('Inner regional Australia' and 'Outer regional Australia') and remote areas ('Remote Australia' and 'Very remote Australia'). Using this approach three geographic regions (Melbourne, the Hunter and Northern Queensland) were purposively selected as the basis from which to draw participating residential aged care facilities.

The second stage of clustering occurred at the facility level. Here, facilities were further stratified by organisational type ('not for profit' and 'private') and facility size ('large', 'medium' and 'small'), to ensure that these characteristics were adequately represented in the sample. This resulted in a determination that Study One would require approximately 2,200 residents from 30 facilities to achieve an acceptable margin of error. This sampling process produced an overall sample frame that included multiple facilities in each cell.

2.2.1 Site selection and recruitment

Based on the sample frame, ten facilities from each geographical cluster were selected and formally invited to participate in Study One. In the small number of cases where a facility declined, another facility from the same sampling cell was invited to participate. Following acceptance of an invitation, each facility was visited by a senior member of the project team to introduce the study and outline the various tasks to be completed.

At the end of this selection process, 10 facilities from each of the three geographical areas had agreed to participate in Study One (refer Appendix 2). The data collection in each area was staggered between March and June 2018 to allow appropriate levels of support to be provided. For most facilities, data collection took place during March 2018 (Hunter, NSW), April 2018 (Melbourne) and May 2018 (Northern Queensland).

2.3 Clinical data collection design

The development of a clinical assessment instrument (RUCS Assessment Tool) was a critically important element of the Study One design phase. The measures included in the tool (and the assessment process itself) underpin the class to which a resident is assigned and are therefore critical to the overall performance of the classification and associated funding model. The objective was to ensure that the tool accurately captured those attributes of residents that drive their need for care.

The development of the RUCS Assessment Tool was undertaken by the study team and supported by an international literature review. It was guided by four expert clinical advisory panels. These panels, which comprised more than 30 expert clinicians, were focussed on the four key areas of resident care:

- function, cognition and behaviour
- wound management
- end of life care
- technical nursing care.

The design of the assessment tool involved identifying domains that were potential drivers of individual care needs, and selecting suitable assessment tools to measure those domains. The selection of tools and items was guided by the following criteria:

- the tool was suitable for external assessment
- the tool was able to be completed in one session, with minimal burden to the resident
- the tool was appropriate for external or internal use for reassessment purposes
- the tool was psychometrically sound
- instruments incorporated in the tool were not subject to royalty or copyright restrictions.

In selecting individual instruments, it was also important to be mindful of the agreed RUCS design parameters (listed above). For example, knowing assessment for funding purposes will be separated from assessment for care planning purposes allowed the tool to be less comprehensive than would otherwise be required. Similarly, it was important to be mindful of not including any specific measures that would be likely to lead to perverse incentives being included in a subsequent funding model.

It was recognised that some overlap existed between tools, sub-scales and individual items. This approach was adopted deliberately to allow the study to assess which tools and items were most useful at identifying the characteristics of residents that drive care costs. The tool

was structured so that residents identified as meeting the definition of being palliative care were excluded from any further assessment. The tool was also designed so that it could be completed by an external assessor with appropriate clinical skills and experience in the aged care sector.

2.3.1 Pilot testing the RUCS Assessment Tool

In February 2018, the draft RUCS Assessment Tool and associated training materials were piloted by IRT, a provider of residential and community care centred in the Illawarra. The aim of the pilot was to test the tool for its useability, including:

- the length of time that it took assessors to gather information and complete the assessment
- to identify factors that impacted on assessor confidence in their ratings of residents
- to ensure the assessment did not cause distress to residents
- to suggest improvements to the training materials.

A hard copy version of the tool was prepared for the pilot to ensure that content of the tool was tested and refined prior to the development of the electronic version.

The pilot took place in three IRT facilities in the Illawarra with six assessors each completing 30 assessments. The assessments were structured to simulate the experience of an external assessment process by ensuring they were completed in care homes other than where the assessor usually worked.

Based on feedback received during the pilot, a set of refinements were made to the layout and structure of the tool and the associated training materials. At the completion of the development process, the study team and the clinical advisory panel members were satisfied that the tool was sufficiently well-developed to be applied in the data collection phase of the study.

The final RUCS Assessment Tool comprised the suite of seven existing tools listed below plus additional items related to palliative care, frailty and technical nursing requirements. A description of the characteristics of each tool is included in Section 5. The complete RUCS Assessment Tool as implemented in Study One is included in Report 7. Key instruments within the tool included:

- The Resource Utilisation Groups – Activities of Daily Living (RUG-ADL)
- The Australia-modified Karnofsky Performance Status (AKPS)
- The Rockwood Clinical Frailty Scale
- The Braden Scale
- The De Morton Mobility Index (DEMMI)
- The Australian Modified Functional Independence Measure (AM-FIM)
- Neuropsychiatric Inventory – Nursing Home version (NPI-NH).

2.4 Service utilisation data collection design

The service utilisation (staff time) data collection was a critical element of the Study One design process. Given the significant proportion of total cost that salary expenditure represents for aged care facilities, great emphasis was placed on developing a study protocol that would result in comprehensive and accurate data being collected. It was equally important to be mindful of the imposition that the process could place on staff.

The use of barcode scanning technology was an important feature of the study. This approach was adopted as it was a less time consuming and more convenient for staff to carry small barcode scanners and scan cards than recording details on paper forms. It also enabled data to be captured in real time as activities were undertaken or shortly thereafter.

Business rules were developed to support the staff time data collection. One of the unique features of the study was the distinction between shared care and individual care that is driven by the needs of each resident. The service utilisation data collection only captured data associated with time spent delivering 'individual care' (refer Appendix 3).

For the purposes of the study, **individual care** was defined as care that is tailored to the care needs of an individual resident. Differences in individual care time between residents are likely to be associated with differences in assessed function, cognition, behaviour and health status.

In contrast, **shared care** was defined as care that is not tailored to individual resident needs and that all residents generally benefit from equally. This included care activities such as general supervision in common areas, clinical care management and quality activities and incidental brief interactions with residents.

The expert nursing clinical advisory panel worked with the study team to identify broad categories of individual time. Nine activity categories were identified for general care staff. An additional eight nursing-specific activities categories were also identified that were captured by nursing staff. Scan cards were developed corresponding to the two sets of activity categories. Activity descriptions and barcodes were printed onto A6 sized cards for use by staff during the data collection.

2.5 Financial data collection design

The final element of Study One was a financial data collection. A data collection template, containing data associated with expenditure incurred during the service utilisation data collection period, was developed for completion by the nominated finance service contacts for each facility.

The financial data were captured in sufficient granularity to allow a cost per resident day to be calculated for residents for whom clinical and service utilisation data had been captured. Direct and indirect costs were allocated to resident days based on a number of business rules. Direct salary costs, for example, were allocated based on the average number of minutes of individual time recorded per day for each resident. The resulting average cost per resident day was used to validate the classification and to inform decisions about cost relativities.

In the overall RUCS design the financial data collections for Study One and Two were aligned at the level of key cost components, such as salary groups, consumables and administrative costs. The rules for cost allocation in both studies were also aligned. This enabled comparison across the two collections and was an additional source of overall data validation. This was a critical design feature for the overall project as the results of Study One and Study Two would ultimately have to be brought together in the design considerations for the blended (fixed and variable) funding system.

3 Data collection

3.1 RUCS Assessment Tool collection

The RUCS Assessment Tool was completed on the majority of residents in the 30 facilities participating in Study One. Assessments were not completed where a resident (or their carer) declined to participate or where the person was at the home to receive short-term respite care.

Assessments were undertaken by external assessors to allow the external assessment process to be evaluated. The assessor workforce comprised 20 registered nurses with a minimum of five years of experience in the aged care sector. All assessors were trained in the use of the RUCS Assessment Tool by the study team and were supported during the data collection period through an email group, weekly teleconferences and individual communication as required.

The assessments were undertaken in each region during the corresponding period of the service utilisation data collection. Where necessary, assessors observed residents at different times of the day and ensured the data were based as much as possible on their independent professional judgement.

An important question for Study One related to the feasibility of the external assessment process. That is, it was important to assess whether appropriately qualified assessors, independent from the care homes, were able to conduct assessments based on their professional judgement and within a reasonable time period. This included assessing the ease with which the different components of the assessment tool could be completed and whether the assessors needed to rely on information from care home staff as a key source of information.

The time taken to carry out the assessments ranged from less than 15 minutes (2 percent of cases) to two hours or more (4 percent). However, the majority of assessments (68%) took between 30 minutes and one hour to complete. In more than 90% of cases, assessors were either ‘very confident’ or ‘fairly confident’ that the ratings recorded for residents were accurate and more than 75% of assessments were rated by the assessor as being either ‘easy’ or ‘moderately easy’ to complete.

Overall, the study found that the RUCS Assessment Tool can be effectively completed by suitably qualified external assessors. One key change was made to the RUCS Assessment Tool based on feedback from the assessors and subsequent advice from the clinical advisory panel. This issue is discussed in detail in Section 7 of this report.

At the conclusion of the data collection period, a total of 1,877 resident assessments across the 30 participating facilities were available for analysis.

3.2 Service utilisation data collection

The service utilisation data collection was completed over one calendar month at each site between March 2018 and June 2018.

3.2.1 Site training and preparation

During the two weeks prior to the start of the data collection, training sessions were conducted at each site. Where possible, all staff members involved in the data collection attended a training session. The training included practical sessions using the barcoding scanners and scan cards.

Additional sessions were held as required to ensure that all relevant staff were trained. Resources to support the data collection were provided to each facility, which included all necessary scanning equipment, a study manual, laminated instruction sheets, training slides and regularly updated FAQs.

During this period, software was loaded on designated computers to allow data to be uploaded. Work stations were set up at strategic locations in each facility where staff could collect and return scanners and scan cards at the start and end of each shift. Arrangements were also finalised in relation to charging of scanners and uploading of data at each site.

3.2.2 Data collection

Barcode scanners and code sheets were used to capture details of the number of minutes spent delivering individual care to residents. The scope of the data collection included morning and afternoon shifts, but excluded staff working night shifts. This is because all time on night shift was defined as shared time that would be costed equally across all residents.

Staff used the barcode scanners to record the beginning of an activity by scanning the relevant activity barcode on the card and the barcode of the resident/s. Scanning the 'STOP' barcode recorded the end of that activity. Activities were stored on each scanner until it was connected via a USB cable to a computer running appropriate software. This normally occurred at the end of a shift. The data were then downloaded onto a designated computer and sent securely to a server at the University of Wollongong.

The service utilisation data collection required a considerable investment of resources by staff at each facility. Extensive support was provided by the study team to support the data collection. A member of the study team (cluster coordinator) was present in each region throughout this period to provide ongoing on-site support. Each facility was visited regularly by the cluster coordinator and other members of the study team to provide feedback, address issues that arose, and provide additional training and resources.

The use of barcode scanning technology allowed ongoing review of the data quality. Detailed reports were provided to facilities and their cluster coordinator on a twice weekly basis. These provided a summary of data that were collected in the previous week, including the amount of individual care provided by each staff member, an activity summary by capture method, care delivery location and activity type, and a summary of missing or unusual data by staff member. Facility managers were encouraged to review the report and discuss any issues with staff.

Overall, staff reported that the data collection process was not overly burdensome and required only a few additional minutes to complete during each shift. By the end of the data collection, more than 1,600 staff members from the 30 facilities had recorded more than 315,000 staff time records.

4 Preparatory analysis

This section focusses on the preparatory analyses of the clinical assessment and service utilisation data. It describes the processes undertaken to assess the quality of the data, mechanisms for data cleansing and how the data were consolidated into a format appropriate for the subsequent classification development analyses.

4.1 Preparation of the clinical assessment data

The Study One resident sample included 1,967 residents in scope for a clinical assessment. Of these, 56 (2.8%) did not provide consent, 19 (0.9%) were unavailable for assessment during the data collection period, and 15 (0.7%) died prior to being assessed. As a result, 1,877 clinical assessments were available for analysis.

Clinical assessments were uploaded via an online form into a relational database. The data were subsequently extracted into a spreadsheet and prepared for analysis.

4.1.1 Overview of resident assessment data quality

The 1,877 clinical assessments were assessed for completeness, consistency, accuracy, validity, and timeliness.

Completeness

Data completeness for each of the clinical measures was tested. The Resource Utilisation Groups – Activities of Daily Living (RUG-ADL) score, Australia-modified Karnofsky Performance Status (AKPS), Rockwood Clinical Frailty Scale, Braden Scale, technical nursing, palliative care and frailty measures all had completion rates of greater than 97%. The lowest completion rates occurred in the De Morton Mobility Index (DEMMI) (94.6%), the Australian Modified Functional Independence Measure (AM-FIM) (92.5%) and the Neuropsychiatric Inventory – Nursing Home (NPI-NH) questions (88.7%).

Clinical guidance was sought to allow the imputation of missing data items where appropriate. A total of 462 missing items were imputed, representing 0.4% of all data items. Following this process, the completion rate was greater than or equal to 96% for all data items. Table 1 shows the completion rate for each clinical measure before and after the data imputation. A summary of the rules applied in this process is included in Report 7.

Table 1 Completion rate for clinical measures before and after data cleansing

Clinical Measure	Number and % complete pre-cleansing n (%)	Number and % complete post-cleansing n (%)
RUG-ADL	1,859 (99.0%)	1,876 (99.9%)
AKPS	1,872 (99.7%)	1,876 (99.9%)
Rockwood	1,863 (99.3%)	1,863 (99.3%)
Braden	1,837 (97.9%)	1,864 (99.3%)
Technical Nursing	1,865 (99.4%)	1,865 (99.4%)
Palliative care	1,858 (99.0%)	1,858 (99.0%)

Clinical Measure	Number and % complete pre-cleansing n (%)	Number and % complete post-cleansing n (%)
Frailty	1,863 (99.3%)	1,863 (99.3%)
Raw DEMMI	1,775 (94.6%)	1,802 (96.0%)
AM-FIM	1,736 (92.5%)	1,851 (98.6%)
NPI-NH	1,664 (88.7%)	1,823 (97.1%)

Consistency

Data consistency of the clinical assessment data was maximised through a mechanism where assessors entered scores into an online data collection system that restricted item responses to a pre-defined list. The online system also ensured that the data were collected in a consistent format, which further reduced the risk of data entry errors. A check of the 1,877 records confirmed that all possible responses had been captured for each data item in the dataset. Therefore, no further adjustments were required.

Accuracy

The accuracy of the clinical assessment data was assessed through a process whereby senior members of the study team and the clinical advisory panels reviewed descriptive summaries of the reported data. As no significant errors were identified, it was decided that no further adjustments were required.

Validity

Data validity of the clinical assessments was tested by assessing correlations within and between related clinical tools. The correlations showed a strong relationship between various items and sub-scales that was consistent with what would be expected clinically. On this basis, it was decided that further adjustments were not required. These relationships were used as the basis for a series of validation tests in subsequent assessments.

Timeliness

Data timeliness of the clinical assessment data was tested by comparing the date on which the resident was assessed and the month in which the service utilisation data were collected. This showed that 97.6% of assessments were completed within one week of the data collection month ending. No adjustments were therefore required.

4.2 Preparation of the service utilisation data

A total of 1,600 aged care facility staff members collected 315,029 staff time activity records during the study period. Staff time was reported for 1,967 permanent and 32 respite residents representing 60,990 resident days.

4.2.1 Overview of service utilisation data quality

A range of measures established prior to and during data collection (including site training, cluster coordinator support and data quality reporting) resulted in a high level of confidence

in the overall quality of the data. At the same time, it was recognised that some under-reporting and other issues often arise in studies of this type.

The study team was aware that some issues had arisen for a small number of facilities in this study. This included not all staff being able to attend a training session, communication issues within facilities, and unrelated activities occurring within a facility that impeded the data collection process.

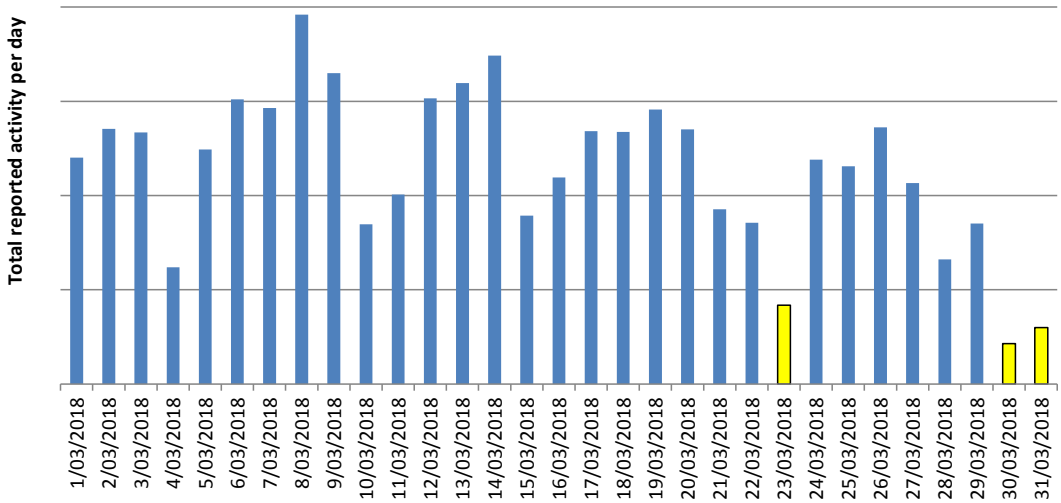
A suite of data quality checks were undertaken in this context to assess the completeness, consistency, accuracy, validity, and timeliness of the service utilisation data.

Completeness

The total volume of reported activity was investigated for each facility for each day of the data collection period. This suggested that most facilities experienced 'outlier' days during the study period. In some cases, there was evidence of a decrease in the volume of reported staff time towards the end of the study month. This may have been a result of a 'fatigue' factor associated with the data collection process. In other cases, outlier days occurred throughout the month.

In order to address this issue, outlier days were identified using interquartile range extreme values. Figure 1 below shows an example of the daily volume of activity at a sample facility over the study month. Outlier days are highlighted in yellow. On average 2.1 days were identified at each facility and an adjustment for these days was made in the analysis.

Figure 1 Daily volume of activity at a sample facility over the study month



As an additional check for data completeness, the daily volume of individual activity per resident was investigated. It was found that a small proportion of residents had no individual activity on certain days. When this occurred, facilities were contacted individually to clarify whether this was most likely due to the resident not being at the facility (e.g. gone to

hospital or on leave), a data collection issue or whether the resident genuinely may not have had any activity recorded on that day.

In these cases, adjustments were made for analysis purposes as follows:

- When a facility indicated that missing data were most likely to have resulted from a data collection error, that day was excluded from data analysis.
- When a resident was not at the facility, the day was considered out of scope and excluded from data analysis.
- When a facility advised that a resident had no activity on a day, zero values were retained for data analysis.

Consistency

Some issues with data consistency arose in the early stages of the data collection mainly due to barcodes being scanned in the incorrect order or 'STOP' not being scanned at the end of an activity. This issue was addressed by providing feedback to facilities and providing additional training as required.

This issue did not result in the need for any adjustments as a set of validating algorithms were developed and incorporated into the processing software to identify and correct these inconsistencies.

Accuracy

Extreme values were checked by examining the total number of hours of recorded activity for each staff member each day. Outlier days were identified based on interquartile ranges and further investigated. Overall, 429 of 14,985 (2.9%) uploads had at least one extreme value. In many cases the extreme value had occurred due to the 'STOP' barcode not being scanned, and in these cases the extreme value was excluded from analysis. In other cases where staff members scanned more time than was available in the shift, the duration was redistributed to residents based on the timestamps that were embedded in the data.

Validity

The quality reports submitted to facilities had a series of in-built validation checks that were monitored throughout the data collection. No further adjustments were therefore required.

Timeliness

The capacity to capture staff time data in 'real time' using barcode scanners ensured that almost all data were captured in a timely manner (scanned and entered on the day that the service was provided). The data collection process did allow for data to be validly entered retrospectively (on a later day) where necessary. As this occurred in less than 0.1% of staff time records, no adjustments were required.

4.3 Data linkage

At the end of the preparatory analysis, 1,877 residents had both clinical assessment and service utilisation data. These resident records were linked using a unique linkage key that had been assigned to each resident at the beginning of the study. The linkage process resulted in a single record for each resident that contained demographic data, clinical assessment data and activity data that could be used for classification. The following section presents a profile of Study One residents based on a descriptive analysis of the Resident Assessment Instrument data.

5 The Study One resident assessment dataset: Descriptive analysis

This section provides a descriptive overview of the profile of Study One residents. The purpose of this analysis is to explore the profile of the study participants and to assess the applicability of each tool for classification development purposes. A description of the key characteristics of each tool is also provided as part of this analysis.

The RUCS Assessment Tool used in Study One comprised seven existing instruments, with additional questions related to technical nursing requirements, palliative care and frailty. Domains including functional independence, mobility and frailty were measured. Demographic data relating to the residents were also available as well as some additional details, such as a need for technical nursing support and whether or not the resident had a history of falls.

To assess each instrument's suitability for classification development, the distribution of scores across the possible range of values needs to be considered. The relationship between the scores and a measure of resource usage provides additional insight into the suitability of the assessment scores as a variable in a casemix classification. If the relationship is strong, the characteristic of the client being measured can be considered to drive the cost of the care required.

It is noted that the number of residents in the analysis in this section (n = 1,880) differs slightly from the number subsequently included in the classification development process (n = 1,877) due to three residents having no reported service utilisation data.

5.1 Resource Utilisation Groups – Activities of Daily Living (RUG-ADL)

The RUG-ADL is designed to provide a profile of late loss function using four items - eating, transfers, toileting and mobility. It is a measure of the assistance and resources required to carry out the respective functional tasks. Scores are added and the total ranges from 4 (completely independent on these items) to 18 (completely dependent on these items). The distribution of scores within the study population is shown in Table 2. Although some scores appeared relatively more often in the data, there was a reasonable spread across residents.

Table 2 RUG-ADL scores

RUG-ADL total score	No. of residents	Percentage of residents
4	472	25%
5	34	2%
6	136	7%
7	54	3%
8	90	5%
9	47	2%
10	141	8%
11	133	7%
12	49	3%
13	76	4%

RUG-ADL total score	No. of residents	Percentage of residents
14	108	6%
15	62	3%
16	71	4%
17	195	10%
18	212	11%
All residents	**1,880**	**100%**

5.2 The Australia-modified Karnofsky Performance Status (AKPS)

The AKPS reports a single score that indicates overall palliative functional performance. It is scored from 10 (comatose or barely rousable) to 100 (signifying normal physical abilities with no evidence of disease). The distribution of scores across the study population is shown in Table 3. The vast majority of residents (86%) scored in the middle range of the AKPS (40-70).

Table 3 Distribution of AKPS scores

AKPS score	No. of residents	Percentage of residents
10	3	0%
20	110	6%
30	70	4%
40	179	9%
50	839	45%
60	484	26%
70	112	6%
80	50	3%
90	23	1%
100	9	0%
Unknown	1	0%
All residents	**1,880**	**100%**

5.3 Rockwood Clinical Frailty Scale

The Rockwood Clinical Frailty Scale is used to rate frailty, a non-specific state of increasing risk which reflects multisystem physiological change. It arises from a loss of energy, physical ability, cognition and/or health and it gives rise to vulnerability. The RUCS Assessment Tool included different aspects of frailty. In addition to the Rockwood Clinical Frailty Scale, there were questions about falls history and weight loss.

The Rockwood Clinical Frailty Scale is used to rate frailty with higher scores indicating more frailty. The distribution of scores is shown in Table 4. It can be seen that the majority of residents fell in the middle range on this scale indicating mild to severe frailty.

Table 4 Rockwood Clinical Frailty Scale

Rockwood score		No. of residents	Percentage of residents
1 Very fit		37	2%
2 Well		67	4%
3 Well with comorbid disease		130	7%
4 Apparently vulnerable		182	10%
5 Mildly frail		290	15%
6 Moderately frail		434	23%
7 Severely frail		588	31%
8 Very severely frail		134	7%
9 Terminally ill		4	0%
Unknown		14	1%
All residents		**1,880**	**100%**

Assessors recorded whether the resident had fallen in the last twelve months or not. Just over 50% of residents had had one or more falls during that time period. Assessors also recorded whether or not the resident had fallen in the last four weeks. For 87% of residents, there had been no fall. However, 2% of residents had had three or more falls, with six being the largest number of falls recorded.

A large weight loss over a relatively short period of time can be an indicator of frailty. Of the residents in Study One, 10% had lost more than 10% of their body weight in the last twelve months. To investigate the relationship between this level of weight loss and the Rockwood Frailty Scale, the distribution of scores are presented separately in Table 5 for those who lost this amount of weight and those who did not.

Table 5 Rockwood score by weight loss variable

Rockwood frailty score		All residents	Residents who lost 10% weight (n=195)	Residents who didn't lose 10% weight (n=1,584)
1 Very fit		2%	0	2%
2 Well		4%	2%	4%
3 Well, comorbid disease		7%	4%	7%
4 App. vulnerable		10%	8%	10%
5 Mildly frail		15%	14%	16%
6 Moderately frail		23%	21%	24%
7 Severely frail		31%	36%	30%
8 Very severely frail		7%	13%	6%
9 Terminally ill		0%	0%	0%

It should be noted that residents where either variable was missing have been excluded from Table 5. It can be seen that the distribution across scores is slightly lower than that for the full population, indicating that those who lost this amount of weight were rated as slightly more frail on this separate measure.

Table 6 Rockwood frailty score by time in care (residents with missing scores excluded)

Rockwood frailty score		Time in care			Total
		< 90 days (n=117)	90 -180 days (n=137)	> 180 days (n=1,600)	
1 Very fit		2.6%	2.2%	1.9%	2.0%
2 Well		7.7%	5.1%	3.2%	3.6%
3 Well, comorbid disease		8.5%	8.0%	6.7%	6.9%
4 App. vulnerable		12.8%	5.8%	9.8%	9.7%
5 Mildly frail		22.2%	15.3%	15.1%	15.5%
6 Moderately frail		18.8%	26.3%	23.3%	23.2%
7 Severely frail		22.2%	32.1%	32.3%	31.6%
8 Very severely frail		5.1%	5.1%	7.5%	7.2%
9 Terminally ill		0.0%	0.0%	0.3%	0.2%
All residents		**100.0%**	**100.0%**	**100.0%**	**100.0%**

In Table 6 and Table 7 the relationship between the Rockwood frailty score and other variables in the dataset are shown. Frailty could be expected to vary, perhaps to increase, as time in residential care increases. The relationship between the Rockwood frailty score and time in care is shown in Table 6.

Three different time periods in residential care are shown. Indeed, it does appear that, generally, there is a tendency for those who have been in care for longer to be assessed as more frail.

In Table 7 the overall ability to perform activities of daily living measured by the AKPS is presented by frailty group. There is a positive correlation between the two measures with, not surprisingly, those rated as well and fit scoring higher on their ability to undertake activities of daily living (ADLs). Of those residents scoring 50 or less on the AKPS, 81% were rated as moderately (or more) frail with a score of six or more on the Rockwood Frailty Scale.

Table 7 Rockwood by AKPS (residents with missing scores excluded)

	AKPS score										
Rockwood frailty score	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**	**Total**
1 Very fit					10	6	7	6	3	5	37
2 Well					10	26	10	5	12	4	67
3 Well, comorbid disease			1		30	48	25	18	8		130
4 App. vulnerable			2		64	79	23	14			182
5 Mildly frail			1	1	103	139	40	6			290
6 Moderately frail		1		17	249	161	5	1			434
7 Severely frail		40	34	131	361	21	1				588
8 Very severely frail	2	62	32	28	10						134
9 Terminally ill		3			1						4
All residents	**2**	**106**	**70**	**177**	**838**	**480**	**111**	**50**	**23**	**9**	**1,866**

5.4 Braden Scale

The Braden Scale is used to predict the risk of a pressure wound. It comprises six items assessing degree of sensory perception, moisture, activity, mobility, nutrition and friction and shear. The total score is used and ranges from 6 (indicating an extreme risk of pressure wound) to 23 (indicating no risk). An additional question asked if the sensory perception rating was based on communication, sensation or both. The distribution of total score across the study population is shown in Table 8.

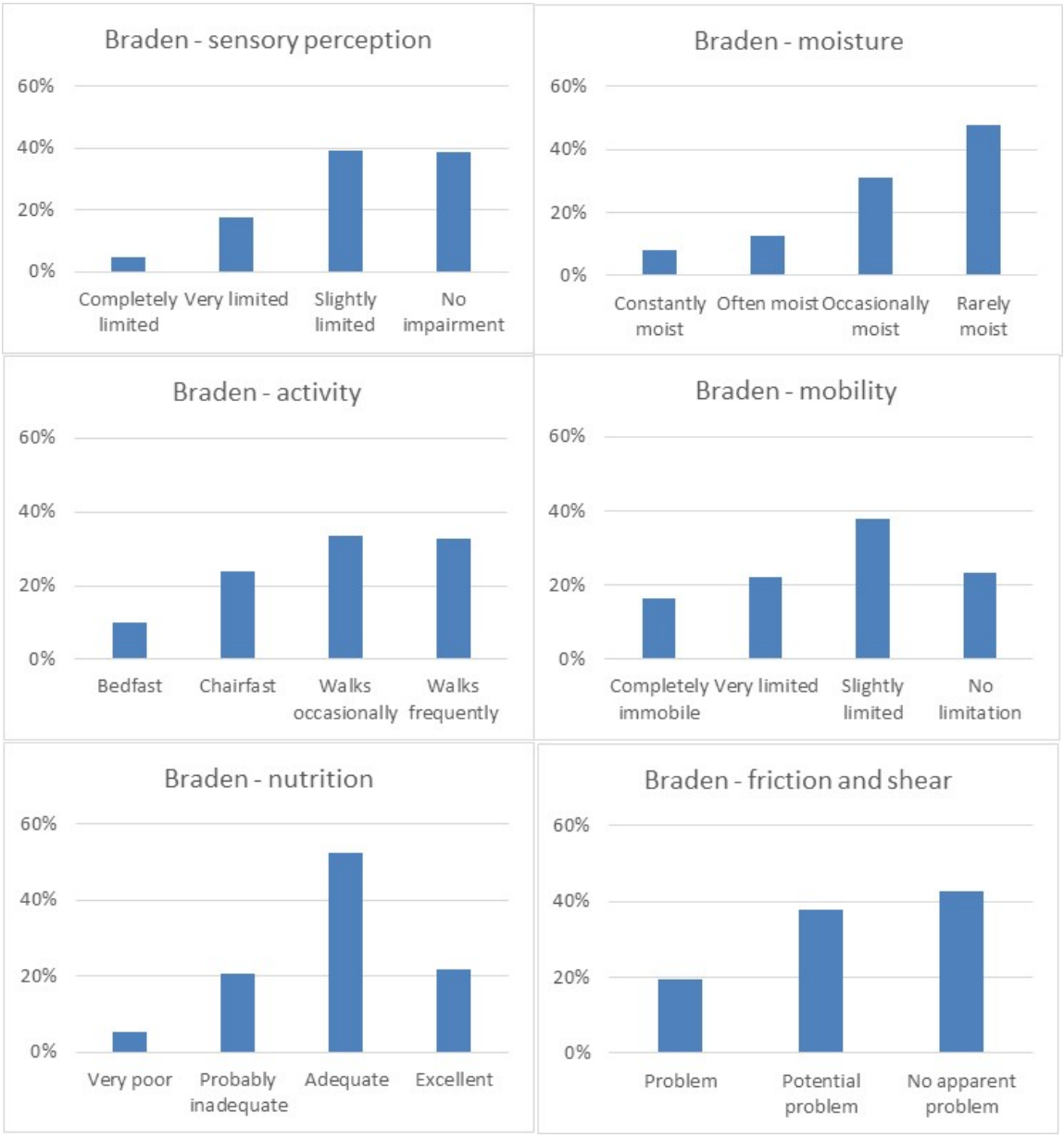
It can be seen that there is a good spread of scores across the whole range of this scale, although there are more high scores than low. For example, 50% of the residents scored from 18 to 23, a range of five points. The range of scores for the remaining 50% of residents was eleven points, from 6 to 17.

Table 8 Braden Scale total score

Braden Scale total score	No. of residents	Percentage of residents
6	5	0%
7	10	1%
8	26	1%
9	50	3%
10	50	3%
11	87	5%
12	69	4%
13	115	6%
14	115	6%
15	122	6%
16	130	7%
17	154	8%
18	159	8%
19	168	9%
20	141	8%
21	177	9%
22	145	8%
23	143	8%
Unknown	14	1%
All residents	**1,880**	**100%**

The distribution of the individual items in the Braden Scale is shown in Figure 2. The smallest number of residents were rated in the most severe category on all items. However, the mode varies between the two least severe categories. For items on moisture and friction and shear, the mode was the least severe category, while for nutrition and mobility, fewer residents were rated as having no real problem than as having a slight issue in the respective domain. For the remaining two items, sensory perception and activity, there was no appreciable difference in the numbers rated in these two least severe categories.

Figure 2 Braden Scale – frequency of response of item scores



The additional question on the basis of the sensory perception rating was completed for 97% of residents in Study One. Of these, three-quarters were based on both communication and sensation while communication alone was the basis for 218 residents, and sensation alone was the basis for 237 residents.

In Table 9, the percentage of responses in each category of the sensory perception item is shown, separated by the way the rating was made. It can be seen that residents for whom the rating was based on sensation only tended to be assessed as more severe on the sensory perception item.

Table 9 Distribution on the Braden sensory perception item by basis of rating

Braden sensory item options	Basis of rating		
	Communication (n=218)	Sensation (n=237)	Communication and sensation (n=1,374)
Completely limited	4%	13%	4%
Very limited	18%	29%	16%
Slightly limited	27%	41%	41%
No impairment	51%	18%	39%

5.5 The De Morton Mobility Index (DEMMI) - Modified

The DEMMI measures mobility in older people. The modification for this study has resulted in four domains being assessed – bed mobility, chair mobility, static balance (for ten seconds or more with no gait aid) and walking. Within each domain there are two, three or four tasks. For most tasks, the resident was rated as either able or unable to perform the relevant activity; for four of the tasks, the resident could also be rated as partially able to perform the activity. Scores were added with the total ranging from 0 to 16 with 0 representing the lowest level of mobility and 16 representing the most independent on the tasks assessed. The distribution of scores is presented in Table 10.

Table 10 Distribution of score on the DEMMI

DEMMI score	No. of residents	Percentage of residents
0	417	22%
1	89	5%
2	70	4%
3	71	4%
4	74	4%
5	73	4%
6	76	4%
7	82	4%
8	100	5%
9	97	5%
10	95	5%
11	156	8%
12	135	7%
13	135	7%
14	71	4%
15	46	2%
16	18	1%
Unknown	75	4%
All residents	**1,880**	**100%**

Table 10 shows that the largest group of residents (22%) were rated as unable to perform any of the tasks assessed. There is a fairly even distribution across the other scores, although fewer residents were rated with the highest score on all tasks. The other noticeable discrepancy is the unexpectedly higher number of residents scoring 11-13. Typically, these residents had some difficulty with activities such as a tandem stand with their eyes closed, standing on their toes or with their feet together, walking independently and standing from a sitting position without using their arms.

Of the 75 'unknowns', only 15 residents were not rated on any items at all. Typically for the others, just one score was missing. Every item was missing for at least one resident. However, the largest number of missing values was for the assessment of the resident's ability to stand from a position of sitting on a chair, without using their arms to help them. The other frequently missing values were for the static balance items – standing unsupported or with feet together or on toes.

5.5.1 Functional hierarchy

As people age, they tend to lose functional abilities in a predictable order. This means that a person who can function at a certain level on one particular task should also be able to carry out other related tasks. In addition, they are likely to be able to carry out 'easier' tasks, or tasks that are lower in the hierarchy.

There is an expected functional hierarchy underlying the items in the DEMMI. The functional hierarchy inferred from the residents' DEMMI assessment scores was compared to this expected pattern.

The agreement between the functional hierarchy observed in the study population and that of the tool was quite high. The majority of residents who were rated as completely able to perform only one task were able to sit unsupported in a chair for ten seconds or more. This is also the 'easiest' task assessed in the DEMMI. However, the next easiest task in the resident population was rolling onto their side in bed rather than forming a bridge in bed.

If a resident was unable to do only one task independently it was most often standing from a sitting position on a chair without using their arms. This was different from the hardest item in the expected hierarchy, a tandem stand with eyes closed. However, the majority of residents who were not independent on two, three or four tasks conformed with the expected functional hierarchy.

5.5.2 Pressure sore risk

Further insight into the effect of mobility issues can be gained by looking at scores on the DEMMI with scores on the Braden tool. Bed mobility from the DEMMI (the sum of the three bed item scores) are tabulated with the Braden total score to give an indication of how the pressure sore risk changes with changing bed mobility in Table 11. Bed mobility rating ranges from 0 (unable to undertake any of the three tasks) to 4 (able to undertake all three tasks independently). Residents with greater bed mobility tend to have a lower risk of pressure injury.

Table 11 Bed mobility and pressure sore risk (missing values excluded)

Bed mobility rating	Number of residents	Average of Braden total score	SD of Braden total score
0	512	12.5	2.9
1	166	15.3	2.8
2	245	17.0	2.6
3	375	18.3	2.6
4	555	20.7	2.0
All residents	**1,853**	**17.0**	**4.1**

5.6 The Australian Modified Functional Independence Measure (AM-FIM)

The Australian Modified Functional Independence Measure (AM-FIM) is designed to measure the care burden associated with physical and cognitive limitations. The original FIM comprises 18 items, 13 of which measure physical function while the remaining five measure cognition. The AM-FIM used in this study removed the stairs item before analysis. The other difference in this study is that ratings are based on what a resident is *capable* of doing (taking into account not only physical ability but also mental health, cognition and behaviour) rather than what they physically do. Also collected with the AM-FIM scores was a flag indicating whether the resident could walk independently or uses a wheelchair.

Often the totals of each of these subscales (the Functional Independence Measure (FIM) motor score and the FIM cognition score) are used as an indication of a person's functional independence. However, the items can be further subdivided into six subscales, providing scores on self-care (eating, grooming, dressing upper body, dressing lower body and toileting), sphincter control (bladder and bowel management items), transfers (bed/chair/wheelchair, toilet and tub or shower), locomotion (walk or wheelchair), communication (comprehension and expression) and social cognition (social interaction, problem solving and memory). Both items and subscales were used in the analysis for Study One.

AM-FIM item scores range from 1, indicating complete dependence, to 7, indicating complete independence on the item. Because of the different number of items in each of the subscales, the ranges of their possible total scores also vary. Summary statistics of each of the AM-FIM subscales are presented in Table 12.

Table 12 Summary statistics of AM-FIM subscales

	Minimum score	Maximum score	Mean score	Median score	SD of scores
AM-FIM Motor	12	84	43.2	43	21.8
AM-FIM Self Care	6	42	21.5	21	10.5
AM-FIM Sphincter Control	2	14	6.8	6	4.1
AM-FIM Transfer	3	21	11.0	12	6.0
AM-FIM Locomotion	1	7	3.9	4	2.2

	Minimum score	Maximum score	Mean score	Median score	SD of scores
AM-FIM Cognition	5	35	19.6	19	9.8
AM-FIM Communication	2	14	8.5	8	4.1
AM-FIM Social Cognition	3	21	11.1	10	6.0
AM-FIM Total	**17**	**119**	**62.8**	**62**	**29.1**

There was a reasonable spread of scores within each of the AM-FIM items. However, calculation of the subscales revealed some additional insight into the scoring. There are two subscales that comprise only two items – sphincter control and communication. For both these subscales there were far more even scores than odd scores (87% for sphincter control and 85% for communication).

This was also true, but to a lesser extent, for the transfer and social cognition subscales, which are both the sum of scores on three items. Closer inspection revealed that, in the majority of cases, the same score had been assigned for each item in the subscale. This could reflect the clinical reality. However it could also reflect difficulties associated with the use of this tool.

5.7 Neuropsychiatric Inventory – Nursing Home version (NPI-NH)

The NPI-NH is designed as a screening instrument to evaluate the mental health symptoms of residents. The assessor records if any of 12 behaviours has been demonstrated by the resident. For each item, if the answer is yes, the frequency, severity and occupational disruptiveness are all rated for that behaviour. Frequency is rated from 1 (rarely) to 4 (very often); severity is rated from 1 (mild) to 3 (severe). Occupational disruptiveness is measuring the increased work, effort, time or distress for the caregiver that is caused by the resident's behaviour and is rated from 0 (not at all) to 5 (very severely).

Table 13 presents summary statistics for the number of behaviours which were recorded as being present on the NPI-NH. It can be seen that for 29% of residents, none of the identified behaviours was present while for a further 39% of residents, between one and three of the behaviours were recorded as being present.

Table 13 Number of items recorded as present on the NPI-NH

No. of items present	No. of residents	Percentage of residents
0	547	29%
1	277	15%
2	262	14%
3	189	10%
4	158	8%
5	145	8%
6	95	5%
7	75	4%
8	55	3%

No. of items present	No. of residents	Percentage of residents
9	22	1%
10	17	1%
11	4	0%
12	6	0%
	25	1%
Unknown	3	0%
All residents	**1,880**	**100%**

Using this tool, for any behaviour that is recorded as being present, there are an additional three questions to answer - how often they occur, how severe they are and how disruptive they are. For the purpose of this study, the most relevant of these additional questions is the occupational disruptiveness as this is most likely to have an effect on the time required by staff to care for the resident.

The prevalence of each of the behaviours assessed using the NPI-NH are presented in Table 14. Refusal to let others help or periods when the resident is noisy or uncooperative were assessed in item C and this was found to be the most prevalent behaviour at 43%, followed by irritability (item I, 35%).

Table 14 Number and percentage of residents with NPI-NH item present

Item on the NPI-NH	No. of residents with item present	Percentage of residents with item present
A Delusions	309	16%
B Hallucinations	197	10%
C Agitation	810	43%
D Depression	651	35%
E Anxiety	545	29%
F Elation	40	2%
G Apathy	428	23%
H Disinhibition	333	18%
I Irritability	649	35%
J Motor	262	14%
K Sleep	290	15%
L Appetite	261	14%

To better understand the level of disruptiveness resulting from the residents' behaviour, the occupational disruptiveness item was evaluated. For each resident, the number of items on the NPI-NH that were rated as present and moderately to extremely disruptive (3-6 on the occupational disruptiveness scale) was calculated. Table 15 presents a summary of these data.

Table 15 Number of NPI-NH items present and moderately to extremely disruptive

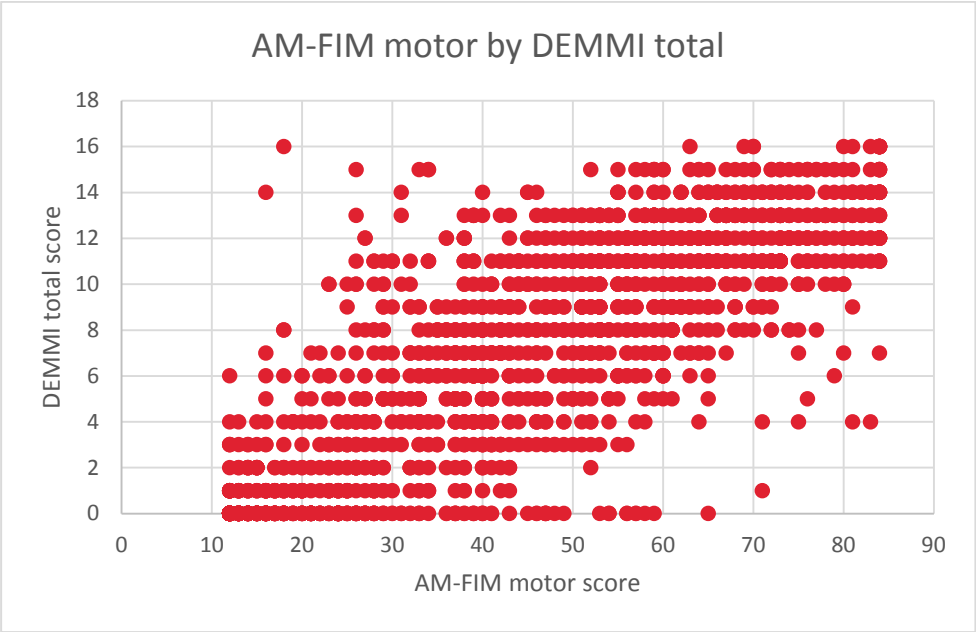
No. of items	No. of residents	Percentage of residents
0	1,232	66%
1	223	12%
2	130	7%
3	109	6%
4	76	4%
5	54	3%
6	24	1%
7	15	1%
8	8	0%
9	8	0%
10	1	0%
All residents	**1,880**	**100%**

It can be seen that for two-thirds of residents, there were no behaviours that were considered to be associated with this level of disruption. However, 15% of residents could be regarded as highly disruptive, with three or more behaviours that were all rated as moderately to extremely disruptive.

5.8 Agreement between assessment tools

Some domains are included in a number of different tools. However, each tool has a focus that is different from the others. In Figure 3, the AM-FIM motor score is plotted against the DEMMI total score. Valid scores were available for 1,793 residents. It can be seen that there was a positive relationship between both variables with high values on one most likely to correspond to high values on the other. However, it can also be seen that there was a lot of variability; for a given score on one of the tools, there was a considerable range of values on the other. This justifies the collection of both measures.

Figure 3 AM-FIM motor and DEMMI total score



It is also possible to compare the values of some item or subscale scores that measure comparable domains. Some examples are presented in Table 16. Many others are possible. However, the examples included here show the relationship between scores on different tools that relate to a similar domain as well as scores within a tool that reflect different levels of difficulty.

Table 16 Examples of comparisons of scores

Criteria		No. of residents	Percentage of residents
RUG-ADL toileting = 1	AM-FIM toileting >=5	435	82%
	AM-FIM toileting <=4	97	18%
RUG-ADL eating = 1	AM-FIM eating >=5	943	95%
	AM-FIM eating <=4	52	5%
AM-FIM grooming >=6	AM-FIM dressing upper body >=6	236	62%
	AM-FIM dressing upper body <=5	145	38%
AM-FIM grooming <=3	AM-FIM dressing upper body <=3	918	98%
	AM-FIM dressing upper body >=4	16	2%
AM-FIM self-care <=12	AM-FIM transfers + locomotion<=12	436	92%
	AM-FIM transfers + locomotion>=13	38	8%

In summary, the descriptive analysis reported in this section highlighted considerable clinical variability between Study One residents. There was substantial variation across the range of values in each instrument and good consistency between those domains measured in several tools. These results indicated that the instruments included in the RUCS Assessment Tool were suitable for use in the classification development process outlined in Section 6.

6 Classification development

The final component of Study One involved generating a set of classes suitable for classifying and funding purposes across the Australian residential aged care sector. This section briefly outlines the key design issues and the methods applied in the statistical analysis. It then presents Version 1.0 of the AN-ACC.

6.1 Design principles

Developing a casemix classification is an iterative process that involves data analysis and clinical consultation. The following underlying principles are used when developing a classification.

Classes should be:

- based on characteristics of the resident rather than the care they receive or the unit where they reside
- comprehensive, mutually exclusive and consistent so that each resident can be classified to one, and only one, class
- clinically meaningful so that they make sense to clinicians
- resource-use homogeneous so that, within a class, the cost of caring for residents is roughly the same.

In addition, the classification should be administratively and operationally feasible. It should be flexible enough to allow improvements when required to accommodate changes in practice, technological advances or the identification of new cost drivers. Moreover, its application should not create perverse incentives.

'Classification and Regression Trees' (CART) is an umbrella term that refers to a type of decision tree algorithm that can be used to generate classification or regression tree predictive models. The CART procedure predicts values of the dependent variable (resource utilisation) based on the values of independent variables (resident characteristics). In this study, the CART regression tree algorithm was used to develop a casemix classification for residents of aged care facilities. The primary statistical software package used to perform this analysis was SPSS.

The performance of a casemix classification can be assessed by the reduction in variation (RIV) or R^2. The RIV is the proportion of the variation in the dependent variable (resource utilisation) that is predicted by the classification model. A high RIV indicates that the classification 'explains' a high proportion of the variation in the dependent variable, and is considered better than a classification with a low RIV. The RIV should not be the only measure used to evaluate the performance of a classification model since it must also be clinically sensible.

Relative value units (RVUs) measure the relative resource utilisation between different resident groups. The RVU is based on the mean resource utilisation for each class of the classification. An RVU of 1 is given to the overall mean resource utilisation for all residents, and the RVU of each class is calculated as relative to the overall mean. For example, a class

with an RVU of 2 indicates that the class has twice the resource utilisation when compared to the overall mean, and a class with an RVU of 0.5 has half the resource utilisation.

6.2 Classification development approach

6.2.1 The unit of counting

The unit of counting used for the class finding was the average number of minutes of individual care received per resident per day. Minutes of individual care was collected as part of the service utilisation data collection and was readily available for analysis. It was considered an appropriate proxy for cost per resident per day given that care staff salaries are the largest contributor to the costs of operating aged care facilities.

6.2.2 Resident characteristics of interest

The resident characteristics of interest (or independent variables) considered for classification development were drawn from the resident assessment instrument and included:

- age
- time in care (< 3 months, 3-6 months, >6 months)
- Indigenous status
- obesity flag
- technical nursing requirements (individual items)
- AKPS score
- Rockwood score
- falls in the last 12 months flag
- weight loss flag
- AM-FIM scores (including individual items and all subscales)
- NPI-NH (including individual items and a disruptiveness measure)
- modified DEMMI total
- RUG-ADL (including individual items and total)
- Braden scores (individual items and total).

For the lower branches in the classification, multiple linear regression analysis was used to identify variables to include in the classification. For this analysis, all variables in the resident assessment tool were considered contender variables. Independent variables that produced statistically significant regression models were used to create the new predictor variables. One of the benefits of using these new predictor variables was that they take into account the combined effect of a number of compounding factors at once.

6.2.3 Classification development analysis

A test-retest methodology was used to determine the stability and reliability of the classification model. Test-retest reliability is often used to establish how closely in agreement successive measurements are when using the same instrument (in this case the classification model). The classification was developed using approximately half the dataset (55%) and then retested on the second half of the dataset. The RVU for each class was calculated using the entire dataset so that the statistical power of the RVU was maximised.

Two main models were considered in the classification development process; a clinical model and a purely statistical model. The clinical model included domains of interest that were likely to be clinically important (as advised by the clinical panels). The statistical model was driven purely by the underlying data. These two classifications were developed and then assessed based on how well each met the evaluation criteria and how they performed in the test-retest.

Based on these results, a combined clinical advisory panel was reconvened and presented with a proposed classification for review. The panel provided feedback and advised on a set of suggested refinements. The panel then endorsed the final recommended classification.

6.3 Results – analysis of resource utilisation drivers

The CART procedure was performed on 1,042 records, producing a regression tree with a binary split for each variable of interest. The RIV for each variable was calculated to determine the most influential resource utilisation drivers. The results are shown in Table 17.

Table 17 RIV of independent variables

Independent Variable	N	Binary split	RIV
AM-FIM Motor	1025	AM-FIM Motor <= 31 , AM-FIM Motor >= 32	0.389
Raw DEMMI	993	Raw DEMMI <= 3, Raw DEMMI >= 4	0.381
RUG-ADL	1036	RUG <= 13, RUG >= 14	0.367
Braden	1030	Braden <= 15, Braden >= 16	0.315
Rockwood	1030	Rockwood <= 6, Rockwood >= 7	0.305
AKPS	1035	AKPS <= 50, AKPS >= 60	0.199
AM-FIM Cognition	1029	AM-FIM Cognition <= 12, AM-FIM Cognition >= 13	0.156
Complex Wound Mgt	1034	CWM=0, CWM = 1	0.022
Disruptiveness	1000	Disruptiveness<=1, Disruptiveness = 2	0.020
Weight Loss	975	Weight Loss = 0, Weight Loss = 1	0.016
Daily Injections	1035	Daily Injections = 0, Daily Injections = 1	0.008
Agitation	1024	Agitation = 0, Agitation = 1	0.007
Falls in last 12 months	995	Falls = 0, Falls = 1	0.002
Time in Care	1033	Time in care <=180 days, Time in care > 180 days	0.002

The analysis of the binary split of the independent variables showed that function, mobility and activities of daily living produced the largest RIV. This indicates that these characteristics are the most important resource utilisation drivers for aged care residents.

None of the other assessment items proved to be a high level predictor of a resident's resource needs. The final output of the analyses described in this section was a draft AN-ACC Version 1.0.

6.4 Clinical panel recommendations

AN-ACC Version 1.0 was presented to a clinical advisory panel comprising representatives from each of the four panels convened for the assessment tool development. This panel was asked to review the draft classification and provide advice on several specific issues.

Advice was sought on whether changes were required in response to the assessor feedback that had been received on the AM-FIM and NPI-NH. There was support to substitute the NPI-NH with the Behaviour Resource Utilisation Assessment (BRUA) if analysis on the Study Four resident reassessment data (which would incorporate both the NPI-NH and the BRUA) indicated that this was appropriate.

This subsequently occurred and thus the final version of the classification presented in the next section incorporates the BRUA rather than the NPI-NH.

The clinical panel also recommended that the seven point scale should be retained in the AM-FIM. However, it was recommended to investigate the impact of aggregating the scores in future refinements. They recommended that it was appropriate to exclude the stair item from the FIM. There was agreement that residents should continue to be assessed using an approach of 'can do' rather than 'do do' as this supported the provision of care that is adapted for each resident. The result is that the AM-FIM instrument was adopted in the final version.

The clinical panel noted that cognition and behaviour do not appear as strong cost drivers in the classification when measured individually. However, these domains drive cost through ADL needs and so the resource utilisation is reflected in these measures. Residents with cognitive impairments and challenging behaviours do not have the capacity to perform ADL tasks. ADL scores are thus a proxy for cognition and behaviour as well as resident's underlying diagnosis (e.g. dementia).

In relation to palliative care, the clinical panel recommended that the proposed class should be retained with a cost weight to be imputed given the lack of study data available. It further recommended that the criteria for the palliative class should be revised to an AKPS score of 40 or less (the context for this recommendation is provided in Section 6.5). Finally, the clinical panel recommended that it was appropriate to include a history of falls as a variable in the classification as this was a recognised cost driver.

Subject to the changes outlined above being incorporated into the classification, the clinical panel unanimously endorsed AN-ACC Version 1.0.

6.5 Overview of the AN-ACC

The AN-ACC Version 1.0 is a branching classification that can be used to classify aged care residents into resource homogenous groups based on their individual characteristics. The structure of AN-ACC Version 1.0 is shown in Figure 4 and Figure 5.

The AN-ACC Version 1.0 has thirteen classes: one class for residential aged care admission for palliative care and twelve classes based on the results of a clinically informed regression tree model. There are three main branches to the classification, defined by the resident's mobility.

Each branch has classes defined by whether or not a resident has 'compounding factors'. Behind each of these sits a statistical model that weighs combinations of scores on other items in the assessment.

These compounding factors are based on multiple regression equations that take into consideration a number of independent variables.

The independent branch has two classes and splits on whether the resident has compounding factors. The compounding factors in the independent branch include the RUG-ADL, AM-FIM cognition, AKPS, daily injections and behaviour.

The assisted mobility branch has five classes and splits on cognition and then on whether the resident has compounding factors. The compounding factors in the mobility assisted branch include the Braden activity score, RUG-ADL, AM-FIM motor, AM-FIM social cognition, AM-FIM communication, AKPS, Rockwood score, disruptiveness, falls in the last 12 months, daily injections, and complex wound management.

The not mobile branch has five classes and splits on function and pressure sore risk, along with compounding factors for the lower branches. The compounding factors in the not mobile branch include the Braden total, AM-FIM eat, AM-FIM transfer, disruptiveness, falls in the last 12 months, obesity flag, daily injections, and complex wound management.

The single palliative care class is included in the classification based on clinical advice that residents admitted for palliative care are clinically discrete and require significant levels of additional resources. As insufficient data were available to calculate a cost for this group of residents, a relative value for this class was imputed.

Figure 4 The Australian National Aged Care Classification (AN-ACC) Version 1.0

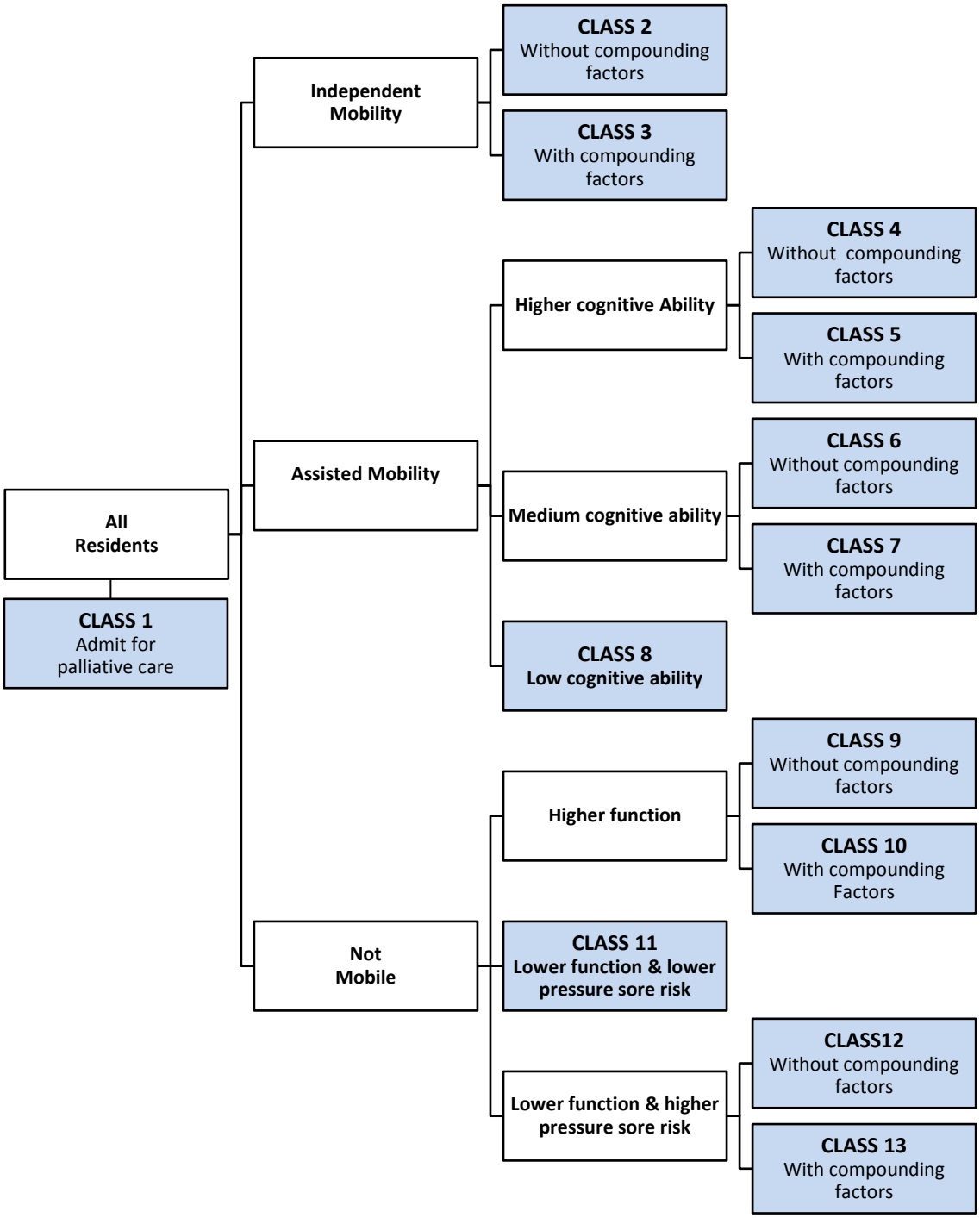
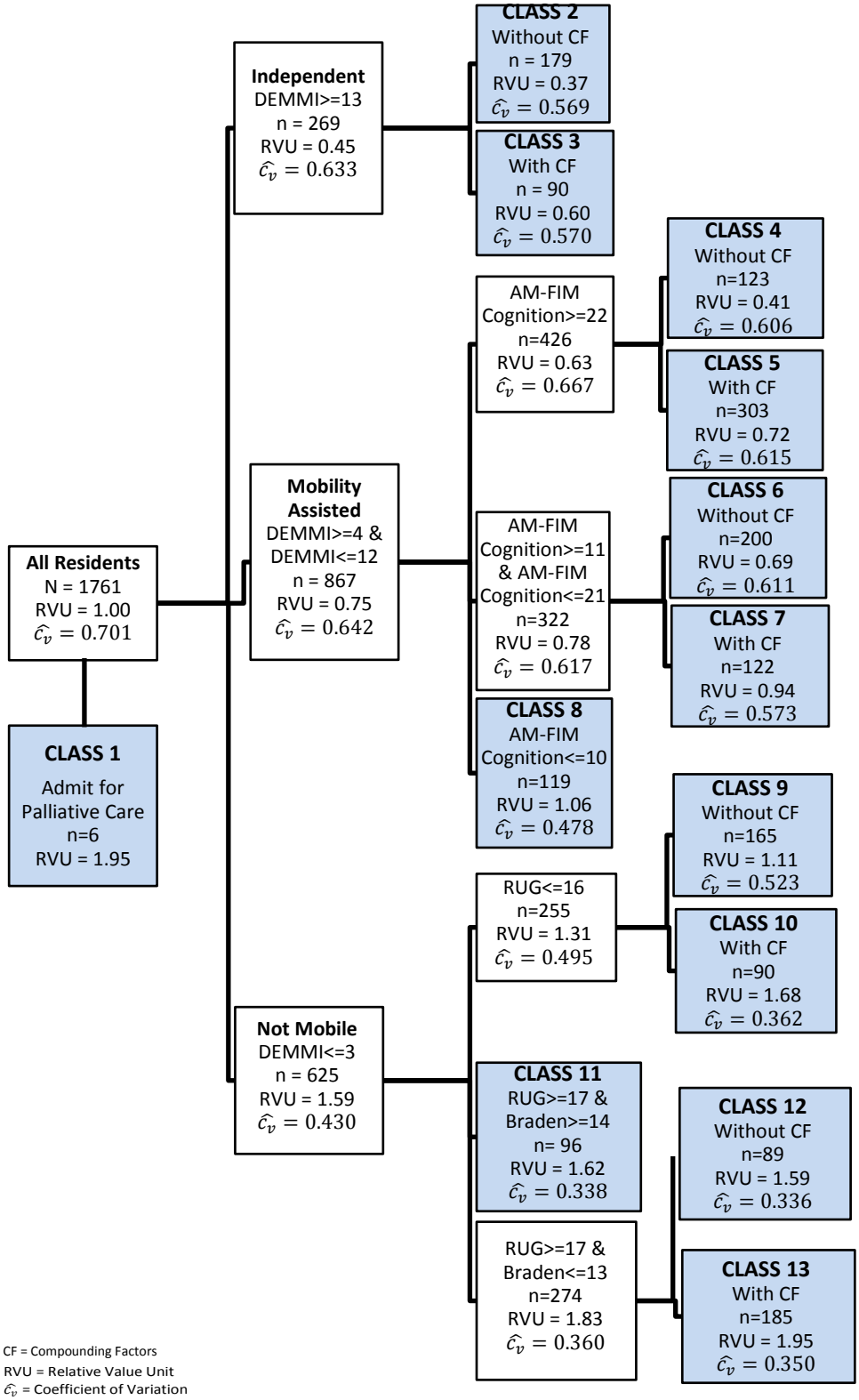


Figure 5 **The Australian National Aged Care Classification (AN-ACC) Version 1.0 (technical description)**



6.5.1 Performance of the AN-ACC Version 1.0

The AN-ACC comprises thirteen classes, which is considered an appropriate number. A classification with too many classes has the potential of becoming unstable, while having too few classes risks the classification not being clinically meaningful.

The number of records within each of the classes is sufficiently large, which indicates that the classification has adequate statistical power. The smallest of the development classes contains 41 records, and as a rule of thumb the minimum should be no less than 30.

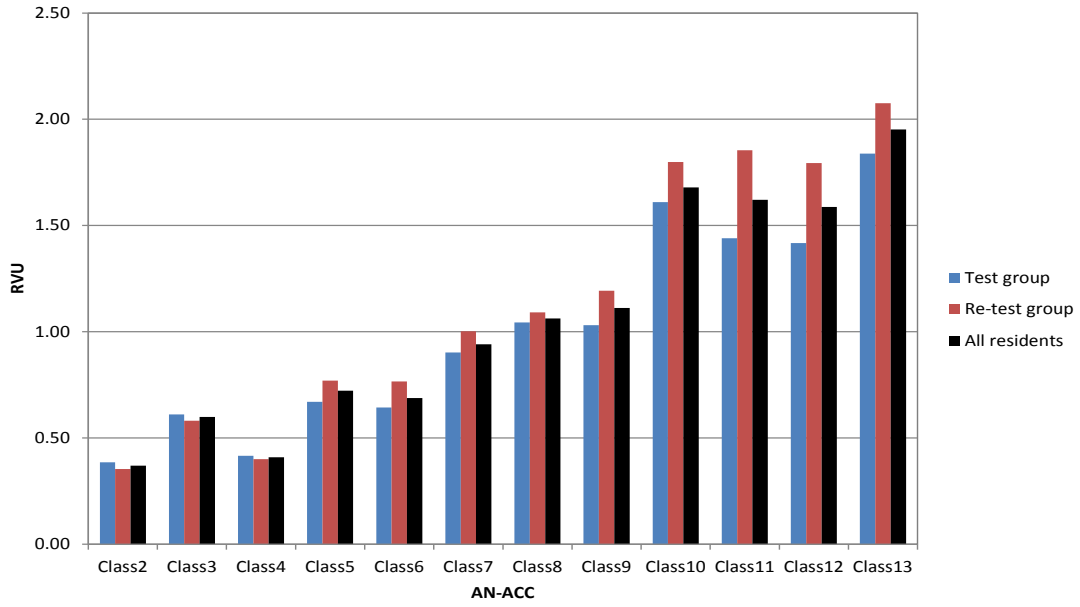
Overall, there is a fivefold difference between the highest and lowest class in terms of relative cost (as reflected by the RVUs). The high variability between the classes indicates that the classification is good at differentiating between residents with different needs.

The coefficient of variation (CV) of each of the individual classes is relatively small when compared to the CV of the dependent variable. This indicates that each class is relatively resource homogenous.

The development classification model has an RIV of 0.52, which means that 52% of the variation in resource utilisation is 'explained' by the classification. The RIV of the development classification is very high in comparison to the ACFI model which has an RIV of 0.20.

When tested using the same method the results of the test re-test analysis as shown in Figure 6 indicate that each class in the test group has a similar RVU when compared to the re-test group. The test dataset has an RIV of 0.52 and the re-test dataset has an RIV of 0.48. As the difference between the test and re-test RIVs is small, the classification model can be considered to be very reliable.

Figure 6 Results of the test re-test analysis



7 Discussion

The RUCS is a significant national study commissioned by the Department to inform funding reforms for the Australian residential aged care sector. Study One of RUCS has not only developed a new funding classification, it has also provided a unique opportunity to generate findings about the clinical profile of residents in Australian care homes and the cost of providing care to those residents.

7.1 Key findings

This report has outlined the goals, methodology and results of Study One. A comprehensive, prospective data collection was completed across 30 facilities in three distinct geographical regions. The study involved 1,877 resident assessments and 315,029 staff time activity records collected by 1,600 staff. It represents the most significant data collection in the Australian residential aged care sector to date.

The clinical profile of study residents supports the hypothesis that costs are driven by care burden associated with end of life needs, frailty, mobility, functional decline, cognition, behaviour and technical nursing needs. The staff time data collection found that close to 50% of staff time was spent delivering care tailored to the specific needs of the resident, while the remaining 50% was spent delivering shared care across all residents. This finding supports a funding model that comprises a fixed per diem price for the costs of shared care and a variable price per day for the costs of individual care.

A casemix classification, the Australian National Aged Care Classification (AN-ACC), has been developed. Version 1.0 comprises 13 classes and explains 50% of the variance in the cost of individual care. The statistical and clinical performance of the classification is considered more than sufficient for it to be adopted in a funding context. This result compares favourably with related casemix classifications such as the Australian National Subacute and Non-acute Patient Classification which explains 55% of the variation in cost and comprises 83 classes.[2]

The AN-ACC comprises three main branches: the 'independent mobility' branch which has two classes and splits on whether the resident has compounding factors; the 'assisted mobility' branch which has five classes and splits on cognition and then on whether the resident has compounding factors; and the 'not mobile' branch which has five classes and splits on function and pressure sore risk, and then whether the resident has compounding factors. In addition, there is a single class for residents admitted for palliative care.

The compounding factors in AN-ACC are based on multiple regression equations that reflect the relative cost of the independent variables in the classification. These include the RUG-ADL, AM-FIM (sub-scales), AKPS, Rockwood score, Braden total, disruptiveness, daily

[2] Green J, Gordon R, Blanchard M, Kobel C and Eagar K (2014) *Development of AN-SNAP version 4: final report* Australian Health Services Research Institute, University of Wollongong, Australia.

injections, behaviour, falls in the last 12 months, daily injections, and complex wound management.

Cost relativities have been calculated for each AN-ACC class that range from 0.37 (Class 2) to 1.95 (Class 13). That is, there is a fivefold variation in cost between the least and most expensive AN-ACC class.

7.2 External resident assessments

One of the key issues considered as part of Study One was the use of an external resident assessment. A key part of the rationale for using this approach in Study One was to assess its suitability for routine implementation across the sector. Study One assessments were completed by a team of registered nurses with at least five years' experience in the aged care sector.

Overall, the overwhelming finding emerging from Study One was that the RUCS Assessment Tool can effectively be completed by suitably qualified external assessors, generally in less than one hour. This finding supports the proposed approach of assessment for funding purposes being separated from assessment for care planning purposes.

7.3 Implications for routine data collection

Implementation of any classification, particularly one that will underpin a funding model, requires that the variables used to assign a class are collected on a routine basis.[3] In Section 1 it is noted that while implementing a new classification for the aged care sector may impact on workforce and infrastructure, it would deliver benefits that far outweigh short term resourcing concerns. The results of this study confirm this.

7.4 Conclusion

The purpose of this study was to develop a new, fit-for-purpose classification for the Australian residential aged care sector. The development of AN-ACC reflects the successful attainment of this goal. AN-ACC represents a clear alternative to the current ACFI model.

The AN-ACC classes are based on the current clinical profile and cost structures of residents in Australian residential aged care facilities. A classification that reflects both current care practices and cost structures has not been previously available in this sector. This in itself represents a significant development for the sector.

[3] Green J, Gordon R, Blanchard M, Kobel C and Eagar K (2014) *Development of AN-SNAP version 4: final report* Australian Health Services Research Institute, University of Wollongong, Australia.

Importantly, the implementation of AN-ACC presents an opportunity to continue building a better understanding of care residents' needs and the factors that drive the costs associated with meeting those needs. The implications of implementing AN-ACC are wide-ranging in terms of measuring quality and outcomes in meaningful ways. Naturally, for this to be achieved, there will need to be further development work to refine the classification and to ensure it continues to reflect current practices and cost structures.

This report has presented the first version of AN-ACC. The subsequent volumes in this series will outline a proposed funding model that addresses the set of related issues that will be critical to ensuring that AN-ACC Version 1.0 can be implemented in a meaningful and sustainable way for the residential aged care sector.

Appendix 1

The RUCS reports

Given the complexity of RUCS, it has been written up in a series of reports as follows:

- **Report 1: The Australian National Aged Care Classification (AN-ACC)**

  Report 1 covers the design and conduct of the study undertaken to develop the AN-ACC Version 1.0 (Study One). It covers the design and use of the AN-ACC assessment tool and the resource utilisation study undertaken to develop AN-ACC Version 1.0, including the preparation and analysis of the data collection. It discusses the results, the classification development process and key outcomes including the statistical analysis and clinical validation.

- **Report 2: The AN-ACC assessment model**

  Report 2 presents detailed findings relating to the external assessment tool and assessment process (informed by Studies One, Three and Four). This includes the development of the assessment tool using expert clinical panels and a summary of feedback from assessors regarding the use of the tool and the suitability of individual instruments. The skills and competencies required for the assessment workforce and other implications for implementation of the external assessment model are considered as well as triggers and protocols for reassessment.

- **Report 3: Structural and individual costs of residential aged care services in Australia**

  Report 3 presents the analysis and findings of Study Two which identified the proportions of total care costs that are fixed (including shared care) and variable (relating to individualised resident care). The analysis focused on the differences in fixed costs between different types of facilities, characterised by ownership, size, remoteness and service specialisation. It includes an analysis of the drivers of fixed care costs.

- **Report 4: Modelling the impact of the AN-ACC in Australia**

  Report 4 presents an analysis of modelling the introduction of the AN-ACC across Australia. This is based on the findings of Study Three. The sampling and assessment data collection process and the casemix of residents in aged care across Australia are described. The focus of this report is on modelling the introduction of the AN-ACC to replace the ACFI.

- **Report 5: AN-ACC: A funding model for the residential aged care sector**

  Report 5 presents the design of a new funding model based on the AN-ACC. It includes a consideration of other payment issues such as existing payment supplements, a discussion of incentives in funding model design and key issues in implementing the new model.

- **Report 6: AN-ACC: A national classification and funding model for residential aged care: synthesis and consolidated recommendations**

This report syntheses and consolidates the findings presented in other reports and provides a consolidated set of recommendations.

- **Report 7: AN-ACC Technical appendices**

  This report is a series of technical appendices that contain detailed data for reference purposes.

Appendix 2

Study One participating facilities

Facility Name	Location	Collection Month
Anglican Care Scenic Lodge Merewether	Hunter, NSW	March 2018
Mayfield Aged Care	Hunter, NSW	March 2018
BUPA Cardiff	Hunter, NSW	March 2018
Calvary St Joseph's Retirement Community	Hunter, NSW	March 2018
RFBI Hawkins Masonic Village - Jacaranda House	Hunter, NSW	March 2018
Calvary Cooinda Retirement Community	Hunter, NSW	March 2018
RFBI Hawkins Masonic Village - Grevillea House	Hunter, NSW	April 2018
BUPA Waratah	Hunter, NSW	April 2018
Calvary Tanilba Shores Retirement Community	Hunter, NSW	May 2018
Calvary Nazareth Retirement Community	Hunter, NSW	June 2018
The Eunice Seddon Home	Melbourne, VIC	April 2018
Baptcare Peninsula View Community	Melbourne, VIC	April 2018
Benetas Broughton Hall	Melbourne, VIC	April 2018
BUPA Templestowe	Melbourne, VIC	April 2018
Eden Park Residential Aged Care	Melbourne, VIC	April 2018
Rosebrook Aged Care	Melbourne, VIC	April 2018
Doutta Galla Lynch's Bridge	Melbourne, VIC	April 2018
The Ashley	Melbourne, VIC	May 2018
Little Sisters of the Poor, St Joseph's Home	Melbourne, VIC	May 2018
Doncaster Melaleuca Lodge	Melbourne, VIC	May 2018
Bolton Clarke Farnorha	North QLD, QLD	May 2018
BUPA Aged Care Cairns	North QLD, QLD	May 2018
Canossa Home	North QLD, QLD	May 2018
Carinya Home for the Aged	North QLD, QLD	May 2018
Loreto Nursing Home	North QLD, QLD	May 2018
Lower Burdekin Home for the aged Ayr	North QLD, QLD	May 2018
Mutkin Residential Aged Care	North QLD, QLD	May 2018
The Good Shepherd Hostel	North QLD, QLD	May 2018
Tully & District Nursing Home	North QLD, QLD	May 2018
Warrina Innisfail	North QLD, QLD	May 2018

Appendix 3

Extract from RUCS service utilisation data guide

Business rules for capturing individual care

To ensure consistency of the data collection across all facilities, the following business rules should be followed in capturing time spent delivering individual care:

- Record individual care activities in real time wherever possible. Use time blocks where it is not practical to record in real time.
- If you are doing multiple 'individual' care activities at the same time, use the 'combined care' activity code. This is most likely to occur in the resident's room.
- Individual time includes face-to-face time and indirect time such as case management.
- If more than one staff member is providing 'individual' care to a resident at the same time, each should record their time separately.
- If more than one resident is participating in an activity, record the total time and each resident involved.
- Some individual care activities are only undertaken by nurses.

The individual care activities where staff time should be captured.

Table 18 provides a guide to the types of activities that should be captured under each of the general care activity categories. These are activities that may be undertaken by any member of care staff.

These activities are listed as examples only and not intended to be an exhaustive list. If you are confident that a service you provide is individual care and you cannot decide under which category it should be captured, capture it under the category that is the closest fit initially (so that we don't miss the opportunity to capture that time) and contact your site coordinator or cluster coordinator for advice.

Table 18 Individual general care activities

General care activities	Examples
Combined care in the residents room	When you enter the resident's room to provide a number of individual care services together or consecutively the total time may be captured under this one activity. For example, you may assist the resident to move to their bathroom, and then assist with showering and dressing – after which you may attend to some pressure area care.
Personal care/hygiene	Routine hygiene (e.g. daily shower or wash) Continence related hygiene (e.g. shower or wash following pad change). Shaving or personal grooming where the resident is unable to complete those tasks.

General care activities	Examples
	Attention to oral hygiene. Dressing a resident or providing assistance with dressing. Toileting and assisting with toileting. Emptying/changing stoma or catheter bag.
Assistance with mobility	Assisting a resident with transfer to and from a bed or a chair. Transferring a resident to or from the dining room, lounge or other parts of the facility. Assistance with mobility outside the facility as required. Assisting the resident with the operation of a mobility device.
Assistance with feeding	Assisting a resident with eating and drinking. This includes sitting with the residents and either delivering the food to their mouth or continually prompting them to feed themselves and chew and swallow the food. This activity is to be captured for residents with either cognitive issues or physical difficulties with chewing and swallowing, for example due to stroke. ***Do not capture*** time spent preparing meals and cutting-up or mashing food to make it easier for the resident to feed themselves.
Pressure area/skin care	Care to existing pressure areas or wounds not requiring complex management. Repositioning residents in a bed or chair where they have mobility issues and have or are at risk of developing pressure areas. ***Do not capture*** general skin care and the application of moisturiser to maintain skin integrity. This is an activity that would be generally undertaken for most or all of the residents in care.
Assessment and/or care planning	This could involve a number of different types of activities, particularly those activities that are undertaken when a resident first arrives in the facility. This may include; • Physical assessment and measurement (weight etc.). • Speaking with families and carers to obtain a resident history. • Consulting with the multidisciplinary care team regarding an individual resident. • The development of an individualised care plan. • Developing a plan for re-ablement or a strategy to address acute problems and behavioural issues for a resident.
Assistance with oral medication	The preparation and delivery of oral medications where the resident is not able to manage themselves, either for cognitive or physical reasons. This involves the staying with the resident and prompting them to swallow the tablet and/or supervising them to ensure the medication has been taken. When tablets are crushed and added to food which is then spooned into the mouth as part of the meal, this should be captured as 'assistance with feeding'. ***Do not capture*** the delivery of medications where a resident is able to manage taking those medications themselves as this is a shared care activity.
Re-ablement / therapies	Time with an individual or group of residents in physical therapy sessions that improve or maintain ADL function or mobility. May include passive and active exercises or craft sessions etc. This could involve multiple residents in one time allocation and, if so, should be captured against each resident.
Social activities/talking with resident	Time spent in socially and mentally stimulating activities. Emotional support and a calming conversation or counselling for residents with

General care activities	Examples
	mental health or behavioural issues is included. This could involve multiple residents in one time allocation and, if so, should be captured against each resident. ***Do not capture*** general day-to-day conversations and communication with the resident. If you are talking with the resident at the same time as you are undertaking another one of the activities listed above, capture the time against the specific activity.

Nursing care activities where staff time should be captured

Table 19 includes a list of the care activities for medical conditions that would usually be undertaken by staff with nursing training. In some circumstances personal care workers will undertake these tasks under the guidance of trained nursing staff and/or following a prescribed protocol. If this is the case the care worker carrying out the task should capture the time taken against the appropriate activity type.

Table 19 Individual nursing care activities

Technical nursing care	Description of examples
Oxygen	Monitoring usage and supply of oxygen. Maintaining airways (suctioning).
Enteral feeding	Care of the stoma for PEG tubes and J tubes. Ensuring the feeding tube flows freely. Monitoring of hydration and bowel movements.
Tracheostomy care	Care of the stoma, keeping it clean and removing discharge or mucous to reduce risk of infection. Maintaining skin integrity around the stoma and under the tape. Ensuring the tube is correctly positioned and secured and free of obstruction.
Catheter care	Ensuring urine is flowing freely (no kinks or blockages in tubing). Maintaining catheter hygiene. Changing the catheter. Securing catheter to prevent pulling, breaking and blockage. Care of the stoma for suprapubic catheters.
Stoma care	Checking and maintaining skin integrity around the stoma. Keeping the stoma area clean and dry. Ensuring that the appropriate sized bag has been fitted to reduce the risk of leakage and skin integrity issues.
Peritoneal dialysis	Taking regular observations (temperature, pulse, blood pressure). Measuring weight and girth daily. Monitoring hydration and nutritional intake and urinary output. Undertaking daily urinalysis.
Daily injections	Depending on medication may require one or two staff to check medication and oversee administration. Monitor injection site/s and re-site if appropriate. Monitor the resident to detect any adverse reactions.
Complex wound	Management of a wound/s that is/are slow to heal due to exudate,

Technical nursing care	Description of examples
management	comorbidities, infection or polypharmacy. Provision of frequent wound care and additional monitoring of skin integrity for complex wounds. Use of protective dressings and frames to promote healing. Ensuing nutrition levels are maintained to promote skin health.

Shared activities where the staff time should not be captured

Table 20 includes a list of care activities that are considered shared care for the purposes of the RUCS. These activities are generally provided across the facility, are services that each resident has the opportunity to receive, or are the care management tasks that benefit every resident, however indirectly.

Table 20 Shared care activities

Shared activity category	Description of examples
Administration	Facility management Staff training Meetings Governance activities
General resident care	Waking residents and bed making routine. Travel time between episodes of individual care provision. General assistance with skin care and grooming where the residents is able to complete these tasks. Helping resident with a single item of clothing (i.e. putting on a cardigan or shoes). The delivery of meals, either to the resident in their room, dining room or elsewhere, and clearing away afterwards. Generally talking with the resident about how they are feeling, exchanging 'pleasantries' etc. General supervision of dining room, activities room or other area. Night staff supervision of the facility and providing some care as required. Managing stocks and supplies and general tidying, both within the resident's room and in the facility generally. Care of the deceased.
Infection control	Managing personal infection control, including PPE and handwashing. Coordinating services around current infection control issues.
Care communication	Routine care documentation and maintenance of clinical records. Regular communication within the care team or external care providers about residents. Providing assistance at routine GP visits. General communication with the family about the status/ welfare of the resident.