CHSD
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Development of the Australian National Subacute and Non-acute Patient Classification Version 4

Final Report

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ahsri
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CHSD
centre for health service development

Janette Green

Rob Gordon

Megan Blanchard

Conrad Kobel

Kathy Eagar

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This is a report of the project to develop Version 4 of the Australian National Subacute and Non-acute Patient Classification. The project was undertaken by the Centre for Health Service Development, University of Wollongong on behalf of the Independent Hospital Pricing Authority

Centre for Health Service Development Team members

Robert Gordon
Janette Green
Kathy Eagar
Megan Blanchard
Conrad Kobel
Jenny McNamee
Maree Banfield
Pam Grootemaat

External Clinical Project Team Members

Richard Chye
Jan Erven
Penny Ireland
Lynne McKinlay
Chris Poulos

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Glossary

ABF	Activity based funding
AHSRI	Australian Health Services Research Institute
AIHW	Australian Institute of Health and Welfare
AN-SNAP	Australian National Subacute and Non-acute Patient Classification
AROC	Australasian Rehabilitation Outcomes Centre
CV	Coefficient of variation
CHSD	Centre for Health Service Development
DSS	Dataset Specification
FIM™	Functional Independence Measure
GEM	Geriatric Evaluation and Management
HoNOS	Health of the Nation Outcome Scale
ICD-10-AM	The International Statistical Classification of Diseases and Related Health Problems, 10th Revision, Australian Modification
IHPA	Independent Hospital Pricing Authority
IQR	Interquartile range
LOS	Length of stay
MMT	Major Multiple Trauma
NHCDC	National Hospital Cost Data Collection
PCOC	Palliative Care Outcomes Collaboration
PCPSS	Palliative Care Problem Severity Score
RID	Reduction in deviance
RIV	Reduction in variance
RUG-ADL	Resource Utilisation Groups - Activities of Daily Living
SCWG	Subacute Care Working Group

Executive summary

The Centre for Health Service Development (CHSD), University of Wollongong was commissioned by the Independent Hospital Pricing Authority (IHPA) to develop Version 4 of the Australian National Subacute and Non-acute Patient (AN-SNAP) classification. This report outlines the objectives, approach and results of the study.

A revised version of AN-SNAP has been produced (AN-SNAP V4) which comprises 130 classes. The classification meets the project objectives of being suitable for both funding and clinical management purposes. The admitted branch of the classification contains 89 classes for overnight episodes/phases and 6 for same-day admissions and explains 55% of the variation in cost. The non-admitted branch of AN-SNAP V4 comprises 35 classes. Data were not available to allow the performance of the non-admitted AN-SNAP classes to be calculated.

The project comprised three major components:

- A targeted review of previous work undertaken in the subacute sector both in Australia and internationally;
- A multi-pronged stakeholder engagement strategy designed to ensure that clinical, jurisdictional and sector representatives have contributed to the classification development process;
- A suite of specialised statistical techniques employed to produce a fully revised version of the AN-SNAP classification that reflects current and evolving clinical practice. These analyses have been based on clinical, activity and financial data obtained from a range of sources, including projects recently undertaken on behalf of IHPA.

An iterative approach to the development process was undertaken in which data analyses and clinical consultation processes were combined to ensure that the results are both statistically meaningful and clinically sensible. The project also involved a significant level of consultation with jurisdictions, clinicians and other key stakeholders across the subacute sector.

The primary source of data was public sector data from Round 16 (2011/12) of the National Hospital Cost Data Collection (NHCDC). Supplementary data were obtained from the Australasian Rehabilitation Outcomes Centre (AROC) and the Palliative Care Outcomes Collaboration (PCOC).

Each branch of the classification was reviewed, with the aim of identifying refinements that improved its performance. This included assessing additional variables where data were available in an effort to incorporate new approaches to the classification.

Overall, the changes incorporated in AN-SNAP V4 can be characterised as modest. The overall structure of the classification has not changed in terms of having separate care types for palliative care, rehabilitation, psychogeriatric care, Geriatric Evaluation and Management (GEM) and non-acute care. The exception to this is the removal of non-admitted non-acute classes from AN-SNAP V4 and the addition of paediatric AN-SNAP classes for the first time. The key changes introduced into AN-SNAP V4 are:

- A change in the description of the two major branches of AN-SNAP V4 from 'overnight' and 'ambulatory' to 'admitted' and 'non-admitted';
- A change in the order of the care type sub-branches within the admitted and non-admitted branches of the classification to improve consistency with national definitions;
- The introduction of four-character alpha numeric code for AN-SNAP V4 classes;
- The introduction of paediatric classes for the palliative care, rehabilitation and non-acute care types;
- The inclusion of six same-day admitted classes (one for each of rehabilitation, palliative care, psychogeriatrics, GEM, paediatric rehabilitation and paediatric palliative care) in the admitted branches of AN-SNAP V4;
- The removal of 'assessment only' classes from the classification;
- The removal of the bereavement class from admitted and non-admitted palliative care branches of AN-SNAP V4;
- Minor refinement to the positioning of age and clinical splits in the admitted branches;
- The introduction of delirium and dementia diagnoses as variables in the admitted GEM AN-SNAP V4 classes;
- The removal of non-admitted non-acute (maintenance) classes from AN-SNAP V4;
- The removal of the Functional Independence Measure (FIM^{TM}) cognitive sub-scale from the admitted GEM branch and from the non-admitted branches of AN-SNAP V4; and
- The removal of single discipline classes from the non-admitted branches of AN-SNAP V4.

The changes to the admitted AN-SNAP V4 classes represent an important improvement on AN-SNAP V3 both in terms of its statistical performance and the extent to which it reflects current clinical practice. The non-admitted AN-SNAP V4 classes represent an initial effort to improve the potential of the classification to be suitable for implementation across the subacute sector. Stakeholders expressed mixed views in relation to options for classifying non-admitted subacute care. There was an emerging view that consideration should be given for the unit of counting for non-admitted activity to be a combination of episode and service event.

The introduction of paediatric classes into the classification represents a major project outcome. It will be important for ongoing development work to occur in this area including the development of a routine collection of AN-SNAP paediatric data in paediatric subacute services.

One of the limitations of the project was a lack of data with which to assess options for making major structural changes to the classification. This remains an important objective for the ongoing refinement of AN-SNAP. Similarly, it will be critical for jurisdictions to continue to implement the routine collection of variables required to assign episodes to AN-SNAP classes. Considerable progress has been made in this area during the last two years. The changes included in AN-SNAP V4 will not add to the data collection burden of services. It will be important, however, for the costing of subacute services to continue to be refined if good quality subacute datasets are to be available for future refinement of the AN-SNAP classification.

1 INTRODUCTION

This is the final report of a project undertaken by the Centre for Health Service Development (CHSD), University of Wollongong to develop Version 4 of the Australian National Subacute and Non-acute Patient (AN-SNAP) classification. CHSD is a research centre of the Australian Health Services Research Institute (AHSRI), Sydney Business School, University of Wollongong. The project was commissioned by the Independent Hospital Pricing Authority (IHPA) and completed between December 2013 and April 2015.

AN-SNAP is a casemix classification that includes four subacute care types (rehabilitation, palliative care, geriatric evaluation and management (GEM) and psychogeriatric care) and one non-acute care type (maintenance care). The primary objective of this project was to develop a revised version of the classification that reflects current clinical practice and that can be used as the basis of Activity Based Funding (ABF) in Australian hospitals. The project has involved extensive data analysis and stakeholder consultation.

This report presents the results of the project. The revised classification (AN-SNAP V4) meets the agreed project objectives. There will be a set of data collection, classification and funding issues that need to be addressed for the successful implementation of AN-SNAP V4. Similarly, as with all clinical classifications, it will be important to ensure that strategies are in place to allow AN-SNAP to be further refined over time. This report includes a discussion of key implementation issues and a set of recommendations for future development work.

1.1 Project objectives

The primary objectives of the project as identified in the Request for Tender were to:

- Review the existing AN-SNAP Version 3;
- Modify AN-SNAP Version 3 to develop Version 4 for ABF purposes;
- Ensure that AN-SNAP V4 is:
    - Supported by the majority of stakeholders;
    - Able to be applied consistently within the subacute and non-acute health sector, in all states and territories; and
    - Built on previous investments in developing the AN-SNAP classification system.

1.2 Context

Under the National Health Reform Agreement 2011, IHPA is required to implement a nationally consistent ABF system for subacute care services. IHPA's determinative function includes developing and specifying the national classifications to be used to classify activity in public hospitals for the purposes of ABF. The AN-SNAP classification system was selected by IHPA in 2012 as the ABF classification system to be used for subacute and non-acute care.

In 2012, IHPA established a Subacute Care Working Group (SCWG), as part of a broader committee structure, to develop approaches to the ongoing classification and costing of

subacute care activities undertaken within public hospitals. The SCWG includes representatives from each Australian jurisdiction, the private sector and major subacute clinical bodies. The commissioning of the current project represents an important element in establishing the infrastructure to support the ongoing implementation of a subacute and non-acute ABF model.

1.3 Background to subacute care and the AN-SNAP classification

Subacute care is defined as 'specialised multidisciplinary care in which the primary need for care is optimisation of the patient's functioning and quality of life. A person's functioning may relate to their whole body or a body part, the whole person, or the whole person in a social context, and to impairment of a body function or structure, activity limitation and/or participation restriction.'[1]

The AN-SNAP classification was developed as a casemix classification for subacute and non-acute patients in a national study conducted by CHSD in 1997[2]. Since that time, AN-SNAP has been used to classify and fund subacute services in a number of Australian jurisdictions and internationally. AN-SNAP classifies care across admitted overnight, admitted same-day, non-admitted and community settings. The current version of AN-SNAP (Version 3) comprises 150 classes, 82 overnight classes for overnight admitted episodes/phases and 68 ambulatory classes for same-day admitted, non-admitted and community episodes/phases. A list of AN-SNAP V3 classes is provided at Appendix 1.

The five care types within AN-SNAP recognise that subacute services are provided in a specialised multidisciplinary context in which the primary need for care relates to the optimisation of the patient's functioning and quality of life. This fundamental difference between acute care and subacute care gives rise to the need for an approach to subacute casemix classification that is not based primarily around patient diagnoses and procedures.

1.4 Project overview

This project has comprised three major components:

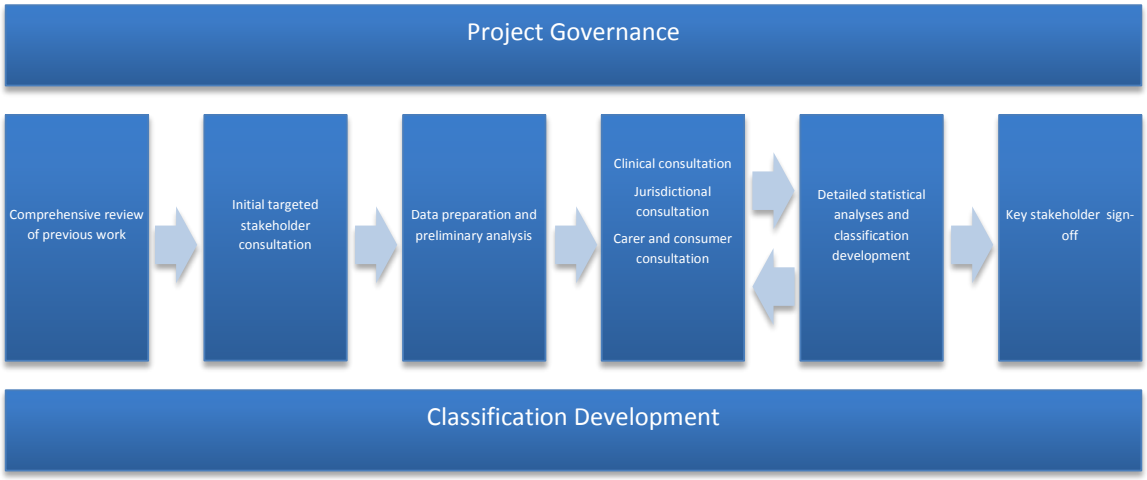
- A targeted review of previous work undertaken in the subacute sector both in Australia and internationally;
- A multi-pronged stakeholder engagement strategy designed to ensure that clinical, jurisdictional and sector representatives have contributed to the classification development process;
- A suite of specialised statistical techniques employed to produce a fully revised version of the AN-SNAP classification that reflects current and evolving clinical practice. These

[1] Australian Institute of Health and Welfare 2013. Development of nationally consistent subacute and non-acute admitted patient care data definitions and guidelines. Cat no HSE 135. Canberra, AIHW.
[2] Eagar K. et al (1997) The Australian National Sub-acute and Non-Acute Patient Classification (AN-SNAP): report of the National Sub-Acute and Non-Acute Casemix Classification Study. Centre for Health Service Development, University of Wollongong.

analyses have been based on clinical, activity and financial data obtained from a range of sources, including projects recently undertaken on behalf of IHPA.

The conceptual approach to the project is shown in Figure 1. This figure highlights the iterative nature of classification development in which data analyses and clinical consultation processes are combined to ensure that the results are both statistically meaningful and clinically sensible.

Figure 1 Conceptual approach to the development of AN-SNAP V4



At a more detailed level, the project involved 17 activities completed in four stages as shown in Table 1. Detailed results of activities one to eight (completed between December 2013 and March 2014) were included in the Stage 1 report[3] and are therefore only summarised in this document. Results of the remaining activities are described in more detail in this report.

This report also includes a set of recommendations for the ongoing development of the AN-SNAP classification to allow future versions to reflect emerging clinical practice and align with concurrent national classification developments.

Table 1 Summary of activities undertaken during the development of AN-SNAP V4

No	Activity	Completion date
1	Activate project and establish project governance arrangements	December 2013
2	Develop and deliver detailed work plan	December 2013
3	Review previous work undertaken in this field	February 2014
4	Produce classification development framework principles	February 2014
5	Establish stakeholder engagement strategy, including description of specialist clinical committee profile and project roles	February 2014
6	Produce targeted stakeholder consultation plan and consultation paper	January 2014
7	Conduct initial targeted stakeholder consultations	February 2014
8	Prepare and deliver Stage one report	March 2014

[3] Gordon R, Green J, Grootemaat P, Kobel C and Blanchard M (2014), The development of AN-SNAP Version 4: Stage 1 Report, Centre for Health Service Development, University of Wollongong.

No	Activity	Completion date
9	Source available subacute and non-acute clinical, activity and cost data	May 2014
10	Undertake data preparation and preliminary analysis	June 2014
11	Review of clinical assessment tools as preliminary AN-SNAP V4 classes are developed	July 2014
11a	Produce preliminary overnight and ambulatory paediatric AN-SNAP V4 classes	July 2014
11b	Produce preliminary adult overnight AN-SNAP V4 classes	July 2014
11c	Produce preliminary adult ambulatory AN-SNAP V4 classes	July 2014
12	Produce AN-SNAP V4 classification	August 2014
14	Conduct national stakeholder consultations	September 2014
15	Deliver draft final report and presentation to the Subacute Care Working Group (SCWG) and IHPA	October 2014
16	Deliver draft final project report	October 2014
17	Deliver final project report, AN-SNAP V4 grouper and user manual	April 2015

2 METHODS

Meeting the objectives of this project gave rise to a range of important methodological challenges. Development of the classification was informed by a literature review and a comprehensive series of consultations within the sector.

2.1 Targeted literature review

Relevant literature from the subacute sector was reviewed to identify issues that were directly relevant to the current project. A detailed report of this review was included in the Stage 1 report.[4] A summary of the key findings from the literature review is provided at Appendix 2.

2.2 Data sources

The availability of good quality clinical, financial and activity data is critical to classification development projects. Ideally, classification development should be based on costed inpatient episode (or outpatient event) level data. If these costed data can be linked with relevant clinical data (captured at the same level), class finding and related analyses can be conducted with a high degree of confidence.

The lack of costed episode level data is the primary reason that the AN-SNAP classification has not been comprehensively reviewed since its initial development. Whilst length of stay (LOS) data are often used as a proxy for cost in acute classification development, the lower correlation between LOS and cost in subacute care means that more caution is required in this sector.

The scope and timeframe of this project precluded a prospective data collection being completed. However, in recent years, there have been significant advances in the volume of costed subacute data available in Australia. Instead of collecting data specifically for this project, potential retrospective data sources were identified. These included:

- Data (public sector) from the 2011/12 National Hospital Cost Data Collection (NHCDC);
- Data from the 2013 subacute and non-admitted costing study;
- Data from jurisdictional subacute data collections, some of which include costed episode level data;
- Data from non-admitted data collections, including patient level service events for subacute type Tier 2 clinics;
- Other available episode level costed subacute data;
- Data from the Australasian Rehabilitation Outcomes Centre (AROC); and
- Data from the Palliative Care Outcomes Collaboration (PCOC).

[4] Gordon R, Green J, Grootemaat P, Kobel C and Blanchard M (2014), The development of AN-SNAP Version 4: Stage 1 Report, Centre for Health Service Development, University of Wollongong.

An early task in the project was to determine which of the above sources would yield data that could be incorporated into a study dataset for analysis purposes. In doing so, it was important to recognise the methodological limitations associated with using data for classification development that was initially collected for other purposes. This was particularly the case in the areas of paediatric and non-admitted care where the availability of data was very limited. Details of the dataset used in the class finding process are outlined in Section 3.2.

2.3 Stakeholder consultations

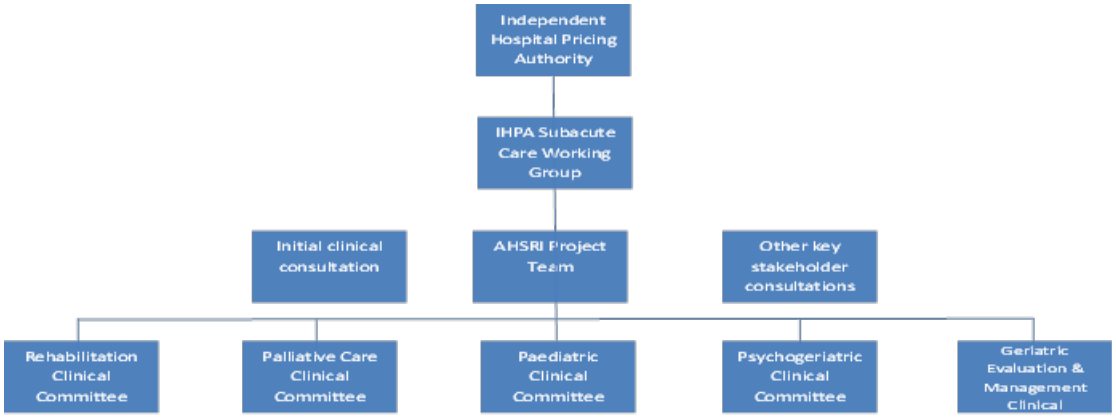
Engaging effectively with clinical, jurisdictional and other stakeholders has been critical during each stage of this project. The specific objectives of the stakeholder engagement strategy were to:

- Ensure that all clinical bodies including medical colleges, relevant subacute specialities and nursing and allied health representative associations were effectively consulted throughout the project;
- Secure widespread endorsement of the classification development methodology;
- Engage effectively with all relevant clinical bodies to ensure acceptance of the revised classification; and
- Engage effectively with other stakeholders, including the Commonwealth and state and territory jurisdictions on the revised classification.

A core element of the clinical engagement strategy involved the establishment of five specialist clinical committees (one for each subacute care type and one for paediatric subacute care). These committees were chaired by senior clinical members of the project team and were critical to ensuring that the project had access to the required breadth of clinical expertise within each area.

The overall structure of the stakeholder engagement strategy adopted for the project is shown in Figure 2.

Figure 2 Stakeholder engagement strategy



During the course of the project, an extensive and targeted consultation process was implemented with relevant stakeholders to fulfil the above objectives. This included face-to-face meetings, teleconferences and workshops conducted at key points throughout the project. The key components of the stakeholder consultation process included:

- During February 2014, a series of 17 stakeholder consultations were conducted with 43 participants from all states and territories;
- Between May 2014 and July 2014, a series of nine meetings (involving more than 40 clinicians) were convened with the five specialist clinical committees;
- In August 2014, a Final Stakeholder Consultation Paper was released that included a formal submission process for providing feedback;
- In September 2014, a national consultation workshop was held at which the draft AN-SNAP V4 classification was presented to clinicians and representatives from the majority of jurisdictions; and
- Throughout the project, additional formal and informal consultation processes were conducted with a range of individual stakeholders on an as-required basis.

The above activities are briefly summarised below. Additional details are also included in various reports that have been submitted to IHPA throughout the project.[5][6][7]

2.3.1 Initial stakeholder consultation

During February 2014, a series of 17 stakeholder consultations were conducted with 43 participants from all states and territories. A list of participants is provided at Appendix 3. The objectives of the consultations were to introduce the project, discuss the project methodology and ensure that key issues requiring consideration were identified.

A wide range of views were expressed during these consultations. Overall, there was widespread agreement on the need for a national subacute classification in Australia that appropriately reflects current clinical practices, models of care, cost patterns and organisational structures. The vast majority of stakeholders agreed that AN-SNAP is the most appropriate classification for this purpose.

The stakeholder consultation process also identified a consistent view that there has been a significant increase in the severity of illness across all subacute care types and an increased demand for these services. As a result, new models of care are emerging that needed to be considered in the development of AN-SNAP V4.

[5]Development of the AN-SNAP Classification V4, Project Methodology and Plan, December 2013, Centre for Health Service Development, University of Wollongong.
[6]Development of the AN-SNAP Classification V4,Stakeholder Consultation Plan, January 2014, Centre for Health Service Development, University of Wollongong.
[7]Development of the AN-SNAP Classification V4,Stakeholder Consultation Paper, January 2014, Centre for Health Service Development, University of Wollongong.

A summary of the key suggestions that were identified during the initial stakeholder consultation is provided at Appendix 4. A detailed report of the initial stakeholder consultation was included in the Stage 1 report[8].

2.3.2 Clinical consultations

As noted, a core element of the stakeholder engagement strategy involved establishing five specialist clinical committees to review the AN-SNAP classes within each care type. It was agreed that each clinical committee would be asked to separately review the AN-SNAP maintenance (non-acute) classes rather than establishing a separate committee for this care type. Each committee included medical, nursing and allied health representatives from several Australian jurisdictions. A list of members of each committee is provided at Appendix 5.

Each committee held two face-to-face meetings (except for the psychogeriatric committee which met only once) between May 2014 and July 2014. At the first meeting, background information was provided to promote a meaningful dialogue around current clinical practices, cost drivers and implementation issues relevant to AN-SNAP. These meetings provided important clinical feedback that allowed the statistical analysis and class-finding work to progress. At the second meeting, a set of draft AN-SNAP classes with a range of supporting data were presented based on the feedback provided at the first meeting. Additional feedback was also obtained from committee members during this period through email and telephone.

As noted earlier, classification development is an iterative process during which data analysis is undertaken in concert with an assessment of the clinical appropriateness of emerging classes. As expected, the specialist clinical committees provided invaluable clinical input into the class-finding process. Details of the specific issues raised by each committee, and the decisions subsequently made in relation to the AN-SNAP V4 classes are included in the results section of this report.

2.3.3 Formal feedback process

A 'Final Stakeholder Consultation Paper'[9] was produced in August 2014 to provide a framework for the final set of stakeholder consultations which occurred during September and October 2014. IHPA conducted a formal submission process inviting feedback on the consultation paper. Eight submissions were received through this process.

A final national stakeholder consultation workshop was held in Sydney on 10 September 2014. In addition, several smaller workshops and consultations were held for stakeholders not able to attend the national workshop. These consultations provided an opportunity to present the draft AN-SNAP V4 classification and discuss a range of classification and implementation issues

[8] Gordon R, Green J, Grootemaat P, Kobel C and Blanchard M (2014), The development of AN-SNAP Version 4: Stage 1 Report, Centre for Health Service Development, University of Wollongong.
[9] Gordon R, Green J, Kobel C and Blanchard M (2014), The development of AN-SNAP Version 4: Final Stakeholder Consultation Paper, Centre for Health Service Development, University of Wollongong.

that had been identified during the development process. The final consultation paper formed the basis of the discussions at each workshop.

Several issues were raised at the workshop and in submissions to IHPA that led to further analysis being undertaken. Several of these related to issues that were associated with the implementation of AN-SNAP V4 rather than the structure of the classification itself. Several of the issues raised led to modifications to the draft classes and associated business rules. Details of the specific issues raised in the submissions and at the workshops, and the decisions made in relation to the class-finding process are included in the results section below.

A list of national workshop attendees is provided at Appendix 6.

2.4 Casemix classification principles

Developing a casemix classification is an iterative process that involves data analysis and clinical consultation. Decisions to accept or reject options are based on a set of underlying principles. IHPA has commissioned a number of casemix classification projects during the last three years. One outcome of these projects has been the development and ongoing refinement of a set of classification development principles. The most recent iteration (refined in the project named '*Investigative review of classification systems for emergency care', undertaken by Health Policy Analysis)* [10] was provided to the project team by IHPA.

For this project, these principles were modified slightly to relate to the specific context of subacute and non-acute classification development. They are reproduced in Table 2 below.

Table 2 Classification principles to be used in the development of AN-SNAP V4

Principles	Description
1. Comprehensive, mutually exclusive and consistent	▪ The classification is comprehensive, with all possible cases (episodes) within the scope of the classification able to be grouped to a class. ▪ Should be able to be applied to all subacute care services in scope of activity based funding and perform similarly (clinically and statistically) when applied to different models and/ or settings of care. ▪ Classes within the classification are mutually exclusive, with every case (episode) in scope able to be grouped to a single class. ▪ Class definitions and assignment to classes are clear, consistent and unambiguous.
2. Clinical meaning	▪ The underlying data elements are useful for clinical management purposes in addition to funding purposes. ▪ Should group patients with similar clinical and other characteristics and/ or requiring similar treatment.

[10] Health Policy Analysis (2014), Investigative review of classification systems for emergency care - Final report, Independent Hospital Pricing Authority, Sydney.

Principles	Description
	▪ The data element makes sense to clinicians, and aligns with the language used by clinicians for clinical management of their patients.
3. Resource use homogeneity	▪ Events (episodes) should be assigned to classes with similar levels of resource use. ▪ Estimates of resource use within classes should be stable over time. ▪ When applied prospectively, the classification should explain a substantial level of the cost variation between classes, while minimising the variability of costs within each class. ▪ When assessing an individual data element for its inclusion in the classification, there is strong evidence that the data element explains variation in costs over and above other cost drivers.
4. Patient based	▪ Should be based on data elements that reflect the characteristic of patients, rather than characteristics of the service provider or inputs to care. ▪ Classification should be able to be applied consistently across different settings.
5. Simple and transparent	▪ The classification has as many classes as are needed for its purpose and no more. ▪ Assignment of cases to classes should occur through a process that is transparent and able to be understood by clinicians and health service managers.
6. Minimising undesirable and inadvertent consequences	▪ The classification relies on data elements that are collected consistently and uniformly. ▪ The classification minimises the reliance on data elements that are open to local interpretation and/or provide incentives to change reporting to optimise funding. ▪ The classification should minimise susceptibility to gaming, inappropriate rewards and perverse incentives. ▪ The underlying data contributing to the classification are able to be audited.
7. Capacity for improvement	▪ The classification and the underlying data elements should provide information of sufficient granularity to facilitate improvement in the classification over time, for example, to reflect changes in practice patterns and technological advances, and to incorporate emerging knowledge about cost drivers. ▪ The system should be sufficiently flexible to adapt to such change without requiring major restructuring.
8. Utility beyond activity based funding	▪ The classification and the underlying data elements should allow the analysis of best practice and facilitate benchmarking. ▪ The data elements required for the classification are useful for

Principles	Description
	purposes other than funding. These may include health services management, monitoring of quality and safety, epidemiological monitoring, understanding practice and cost variation, health services planning and performance reporting.
9. Administrative and operational feasibility	▪ The benefits of the data collected for the classification outweigh the administrative cost and burden of collection. ▪ The collection of data utilises approaches that assist with or are consistent with the implementation of the electronic health/medical record. ▪ The cost to establish/ purchase and maintain the classification system is balanced by the benefits that it offers, and is affordable to the health system relative to other priorities.

2.5 Subacute care cost drivers

Reviewing cost drivers (for incorporation as variables in the classification) was an important methodological consideration for the project. As noted above, treatment in the subacute sector is driven primarily by functional ability and patient goals, rather than underlying medical diagnoses. The functionally based goals of subacute care provide a critical framework for identifying relevant cost drivers. Just as a patient's medical diagnosis predicts both the need for acute care and the cost of that acute care, factors (or cost drivers) such as *impairment, functional status, age, symptom severity and carer availability* predict both the need for and the cost of subacute care.

In the overnight classes of the current version of AN-SNAP, the variables are:

- *Care type* - characteristics of the person and the goal of treatment
- *Function (motor and cognition)* - all case types
- *Phase (stage of illness)* - palliative care
- *Impairment* - rehabilitation
- *Behaviour* - psychogeriatric
- *Age* - palliative care, rehab, GEM and maintenance (non-acute)

The following additional variables are included in the current ambulatory classes of AN-SNAP:

- *Problem severity* - palliative care
- *Phase* – psychogeriatric care
- *Provider type* – all care types

As noted, the project was constrained by the lack of data available to assess the impact of incorporating new variables into the classification. The extent to which data were available to test potential variables and the results of analyses undertaken is discussed in the results section of this report.

Notwithstanding this limitation, the approach to reviewing cost drivers included re-examining the variables in the current version of AN-SNAP as well as investigating variables identified in more recent work and others that emerged during the course of the project consultations.

Potential cost drivers identified as being contender variables included:

- Impairment specific measures in rehabilitation
- Acute medical complications in palliative care, rehabilitation and GEM
- Functional independence (using RUG-ADL) in psychogeriatrics
- Measures of cognition
- Availability of social support
- Comorbidities in all care types

2.6 Subacute care clinical tools

A number of clinical tools are included in the current version of AN-SNAP. Often, the variables identified above as being cost drivers are captured through the completion of clinical assessment tools. To be appropriate for inclusion in a classification, a clinical assessment tool needs to be suitable for all patients receiving the relevant type of care. It should be able to distinguish patients clearly and reliably and the full range of possible scores should be applicable to one or more of the patients being classified. In addition, there should be a clear relationship between the scores allocated to patients and the resources required to treat them.

A number of tools were identified as being potentially worth testing in the development of AN-SNAP V4 subject to the availability of data for testing. Using the limited data available for this purpose and clinical advice, there was no clear evidence that any single tool was more appropriate than any of the tools currently in AN-SNAP.

2.7 Statistical methods used in the development of AN-SNAP V4

As a first step in the statistical component of the project, a preliminary dataset was compiled by linking NHCDC files (containing cost and activity data) with AN-SNAP clinical variable files to create records suitable for developing AN-SNAP V4. There were some limitations with this dataset. AN-SNAP has been used to a different extent in each jurisdiction. Moreover, different business rules have been applied in the collection of subacute and non-acute data on policies such as care type changing. As expected, there were large gaps in the NHCDC data available for the project. For this reason data from additional sources were incorporated into the study dataset.

Patient identifiers were not available in the NHCDC data. However it was possible to match a large number of NHCDC costed records with data from the AROC and PCOC collections, using fields such as admission and separation dates and date of birth.

Once the analysis datasets were built, one for each care type, the process of developing AN-SNAP V4 began, with preliminary statistical results being taken to the relevant specialist clinical committee. Advice provided by that committee was then incorporated into another period of

analysis. Results from that analysis were then presented to the committee and their comments used to inform subsequent data analysis.

Each branch of the classification was reviewed, with the aim of identifying refinements that improved the clinical relevance and the statistical performance of the classification. This included assessing additional variables where relevant data were available, as every attempt was being made to incorporate new approaches to the classification.

2.7.1 Finding the best classes

For each of the analysis datasets, a preliminary exploratory data analysis was conducted. Frequencies of all variables were calculated together with a range of descriptive statistics. Simple linear regression, multiple regression and regression tree analyses were undertaken to establish some potential classes for AN-SNAP V4.

To evaluate these potential classes, average episode and per diem costs and LOS for each class were tabulated, together with their coefficients of variation (CVs), as a measure of class homogeneity. Criteria to compare possible classes in each branch included:

- The number of classes;
- The size of the classes;
- Their coefficient of variation (CV);
- The pattern of average costs across the classes; and
- R^2 or the percentage of variance of cost that can be 'explained' by dividing the data into the relevant classes, to help select the best split. R^2 is often measured as RIV (reduction in variance) or RID (reduction in deviance).

Historically, the statistic used to measure the variance explained by a casemix classification was RIV and this is still routinely produced by some software products. More recently, for example in the development of AR-DRG, the statistic calculated is RID.

Using RID requires an assumption to be made about the distribution of the cost data. A graph of cost data typically shows the cost of the majority of episodes covering a range to the left of the graph. However, there is often a tail to the right, showing those episodes with much higher costs. Right-skewed data such as these are often modelled using a Gamma or a lognormal distribution. Depending on the values of the parameters in these functions, their shapes are often quite similar and either the Gamma or the lognormal distributions can be used to model the cost data.

The RID is a measure of the variance in the cost data that is explained by the classification under the assumption that the selected statistical distribution models the data well. The RID is typically, though not always, larger than the RIV for a given dataset. Whichever measure is selected, RID or RIV, it is a single number for the whole classification. On its own, it provides limited evidence about the performance of a classification. For example, a high RIV or RID can always be achieved by ignoring the necessity for the classes to make clinical sense.

For this reason, other statistical measures are also considered in evaluating the performance of a classification. One of these is the CV. This is a measure that can be used to evaluate each individual class. It provides an indication of the specific classes that perform well and those that could perhaps be better defined.

A CV is the standard deviation of a set of numbers divided by their mean. A standard deviation is a measure that is used routinely to provide an indication of variability. However, it is often difficult to interpret the calculated value of this statistic. By dividing the standard deviation by the mean to calculate a CV, the calculation provides a measure of variability relative to the values that are 'typical' in the dataset.

A CV is expressed as a percentage. It should be noted that the reported CVs have been multiplied by 100. The lower the CV, the more homogeneous is the class. As a rule of thumb, CVs that are less than 100 are generally considered to indicate a relatively homogeneous class. This same principle is used in the development of AR-DRGs. By way of comparison, results from unpublished analyses conducted by AHSRI during the development of AR-DRG V7.0 indicated that approximately 30% of AR-DRGs had a CV greater than 100, using different versions of the classification and costing data from several different years.

Because of the lack of comprehensive data for this project, some branches of AN-SNAP V4 performed better on some of these statistics than others. There was a heavy reliance on clinical judgment throughout the classification development.

2.7.2 Weighting the FIM™ item scores

In all previous versions of AN-SNAP, the FIM™ motor score has been used as a splitting variable in the overnight admitted rehabilitation classes. There is strong evidence that a functional measure is a cost driver for rehabilitation care and the FIM™ is widely used by clinicians who work in this field. It was therefore expected that this tool would also be incorporated into AN-SNAP V4.

The FIM™ motor score is calculated as the unweighted sum of the 13 motor items in the FIM™ instrument. Alternative ways of incorporating motor function in classifying and analysing rehabilitation data have been considered over the years, but there have been insufficient data to ensure the reliability of these other methods.

For this project, there was a substantial volume of costed rehabilitation data, so it was decided to test a weighting methodology for the FIM™ motor scores to be incorporated in AN-SNAP V4. The weights assigned would reflect the variable impact of each item's score on the cost of caring for the rehabilitation patient.

The main advantage of a weighted score is that it enables a more appropriate assignment to a casemix class, with items that have a bigger impact on cost being more influential. For example, the score on an item with a weight of 2 would contribute twice as much to the weighted total as the same score on an item with a weight of 1. Using a weighted total to build the classification therefore results in classes that better discriminate between episode costs.

It should be noted that clinicians will still collect and use the FIM™ as they have always done. The weighted FIM™ will be calculated within the AN-SNAP grouper, as part of the grouping logic. Its inclusion in the classification will therefore have no impact on day-to-day clinical practice.

To set the values of the weights, regression analysis was used to explore the relationship between the FIM™ item scores and cost. In this way, the impact of each of the items could be determined and weights assigned according to the relative impact of the item on the cost of the episode.

Recently, a weighted FIM™ motor score was introduced for classification and funding in the United States (US). The weights reflect the different impact on cost of each of the individual items. In the US, the same set of weights is applied to all impairment types. This set of US weights was tested for AN-SNAP V4.

Several other sets of weights were also tested for inclusion in AN-SNAP V4. Clinical advice suggested that impairment-specific weights were likely to be more appropriate than a single set of weights for all impairments. Impairment-specific weights were therefore derived using the available data, as was a single set of weights for all impairment categories. For some impairment types there were insufficient data for a reliable set of specific weights to be calculated. Where impairments were grouped together in the classification, a set of weights for that group was also derived. The following points are noted in relation to these weights:

- The weights represent the relative impact of the item score on cost;
- If each item had the same impact on the cost of care, the weights would all be 1. In other words, an unweighted total would be appropriate;
- If an item has a weight of more than 1, it will have an impact on the cost of care that is more than average – a weight less than 1 implies the impact will be less than average; and
- Within each impairment type, the weights are scaled to sum to 13 – this means that both weighted and unweighted scores range from a minimum of 13 to a maximum of 91.

3 RESULTS

Findings from the literature, advice provided in the context of meetings and other consultations with stakeholders and statistical analysis of the available data have all fed into the development of AN-SNAP V4. This new version of the classification is presented below, followed by a description of the data used in its development and a more detailed listing of the classes with the results of the statistical analysis and clinical feedback cycle.

3.1 The AN-SNAP V4 classification

In AN-SNAP V4, the structure of the classification has been modified to be consistent with current data collection processes and terminology. In previous versions there were two overarching branches. The first included overnight admitted episodes/phases and the second ambulatory episodes/phases provided in same-day admitted, non-admitted and community settings.

In AN-SNAP V4, there are again two overarching branches. The first includes admitted patient episodes (both overnight and same-day) and the second non-admitted episodes (outpatients and community). Another important refinement in AN-SNAP V4 is the introduction of paediatric classes in the palliative care, rehabilitation and non-acute care types. The structure of AN-SNAP V4 can be seen in Figure 3.

The classification has 89 overnight and six same-day classes in the admitted branch and 35 classes in the non-admitted branch. There are also error classes for each of the palliative care, rehabilitation, psychogeriatric, GEM, non-acute and paediatric (palliative care and rehabilitation) sub-branches. The set of final classes was decided based on the classification principles presented in Section 2.4. In particular, the extensive clinical consultation during the development process helped ensure that the classes have clinical meaning. The classification was developed to be used not only for ABF, but more broadly within the subacute and non-acute care sectors.

A refinement in AN-SNAP V4 is the order in which the care type sub-branches are listed within the admitted and non-admitted branches of the classification. In previous versions of AN-SNAP the care types have been listed in order of the assignment hierarchy of subacute and non-acute care types, namely palliative care followed by rehabilitation followed by psychogeriatric, followed by GEM followed by non-acute (maintenance).

In AN-SNAP V4, the order in which the care types are listed has been modified in accordance with the care type codes assigned within the national data collections, such as the Admitted Patient Care National Minimum Data Set. This is to follow the logic of the assigned codes.

The statistical performance of each step in the development process was evaluated. Potential splits were compared to identify the set of classes that;

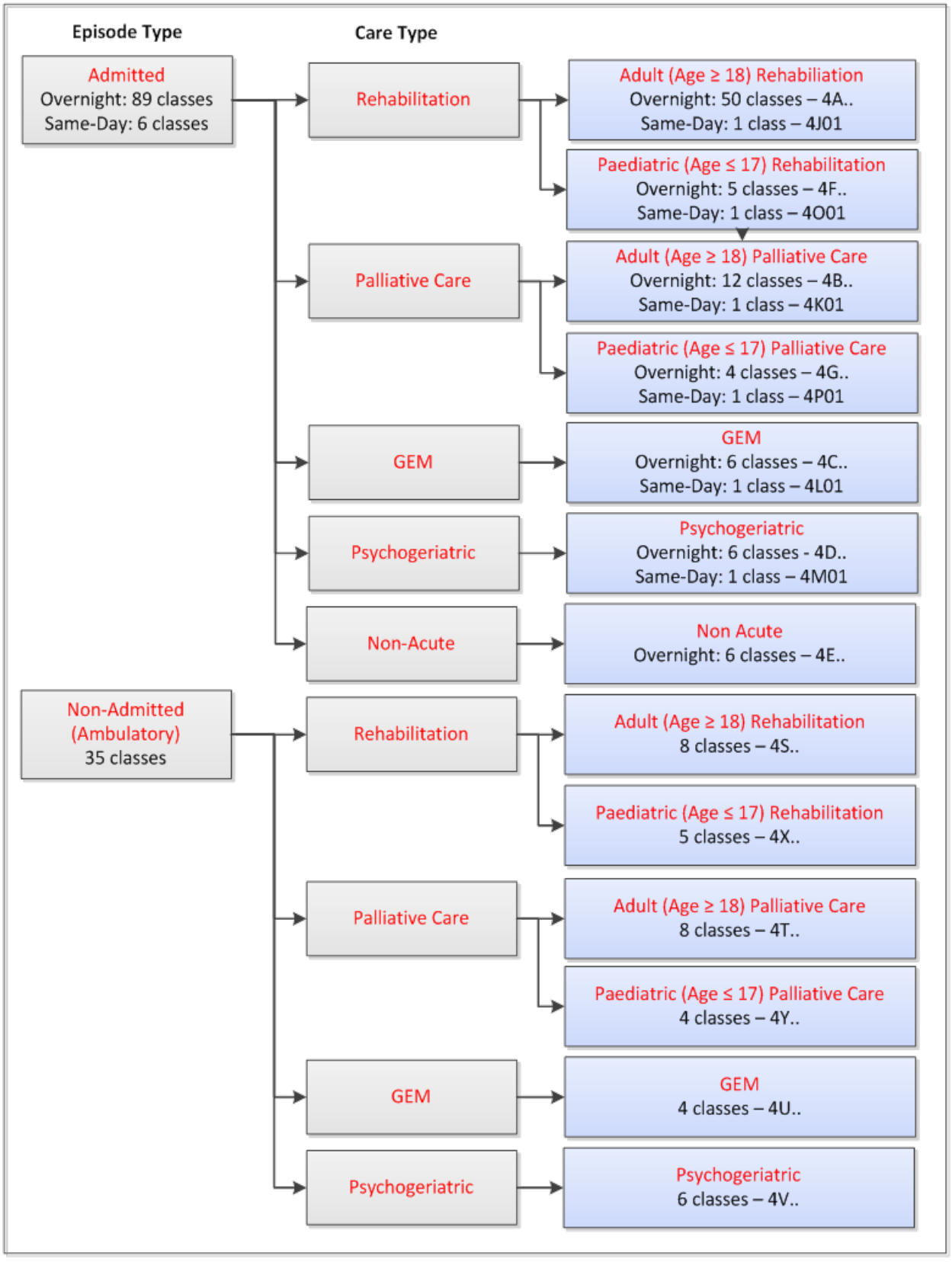
- Provided the best separation in terms of average episode/phase cost;
- Had CVs that were all, or mostly, lower than the parent class;

- ‘Made sense’ with regard to the average costs relative to one another;
- Explained at least 5% of the variation in the cost of the parent class.

Overall, the RID of the classification, based on an assumption of the costs following a lognormal distribution, was 55%. It should be noted that this calculation only covers the branches for which there were data. Therefore, it does not include the paediatric classes, the same-day classes or any of the classes in the non-admitted branches of AN-SNAP.

It may be helpful to provide some context to help interpret this RID of 55%. The value of a RID of a classification can vary greatly, depending on the data that are included for the calculation. For example, using cost from the trimmed 2009/10 NHCDC dataset the RID of AR-DRG V6.0 is 65%. When the Haemodialysis, Chemotherapy and same-day classes are excluded, the RID is 52%. As another example, AR-DRG V7.0 medical classes, excluding same-day episodes, achieved a RID of 36%, using trimmed 2009/10 NHCDC data.

Figure 3 The AN-SNAP Version 4 Classification



3.2 Data used in the development of AN-SNAP V4

The primary source of data for the development of AN-SNAP V4 was public sector data from the Round 16 (2011/12) of the NHCDC. This dataset was provided in a number of separate files for episodes of patients who had been treated in the admitted and non-admitted settings.

The admitted subacute and non-acute NHCDC records were provided in two files. One included cost and activity data that had been submitted by all jurisdictions. The other included clinical and other variables that relate specifically to the AN-SNAP classification. Data in this second file had been submitted by some facilities in some jurisdictions.

To create records suitable for class finding, the data in the two files had to be linked. Only those linked records that included scores on clinical measures that would be tested for inclusion in AN-SNAP V4, such as the FIM™ and the RUG-ADL, could be included in the analysis dataset. The number of records available at each stage of this linking process can be seen in Table 3.

It can be seen from this table that clinical scores were available for fewer than 25% of the costed records. In fact, the number of useable records was even lower than this as some of these scores were provided only at the aggregate level. The corresponding records could not be used in any analysis involving subscales or item-level scores. For example, it had been proposed to test a weighted FIM™ score in the rehabilitation branch of the classification. Records with only an aggregate FIM™ motor score could not be used for this. This affected nearly 40% of the rehabilitation episodes. It should also be noted that data on very few psychogeriatric episodes were available for analysis and the available maintenance (non-acute) data were from only one jurisdiction.

Table 3 Number of records in the NHCDC admitted subacute and non-acute data file

Care Type	Cost data file	AN-SNAP data file	Cost/AN-SNAP linked data	Linked data with clinical measures
Palliative care	32,933	19,589	19,288	14,356
Rehabilitation	77,314	34,575	33,274	20,172
Psychogeriatric	2,010	779	726	238
GEM	26,288	5,810	5,664	1,712
Maintenance (non-acute)	18,583	8,570	8,152	745
Total	**157,128**	**69,323**	**67,104**	**37,223**

The cost of each episode/phase in the linked dataset described in the final column of the previous table was calculated. Summary statistics of these untrimmed cost data are presented in Table 4.

Table 4 Summary statistics of episode/phase costs - untrimmed admitted NHCDC data

Care Type	Minimum Cost	Mean Cost	Median Cost	Maximum Cost
Palliative care	1	5,371	2,818	132,336
Rehabilitation	28	16,922	11,771	460,012
Psychogeriatric	185	36,339	29,421	333,906
GEM	43	17,028	12,174	198,061
Maintenance (non-acute)	65	24,254	14,727	305,266

Only 122 records in the linked dataset were for paediatric patients and virtually no outcome measures were recorded for them. Clinical advice was that this was not a true reflection of the paediatric subacute activity undertaken in public hospitals, as much of this care is provided on a consultation-liaison or shared-care basis and consequently is not recorded as a subacute or non-acute care type in the NHCDC data.

The NHCDC data for non-admitted subacute care were also provided for the project, but did not include any of the relevant clinical data to enable grouping to the current AN-SNAP classes.

Each record in the non-admitted data file represented a service event. These were grouped to clinic type to assess the volume of data available, as care type of the patient was not available. The number of service events and details of the costs for activity in the relevant clinics are provided in Table 5 for adults and in Table 6 for paediatrics.

Table 5 Summary statistics adult episode/phase costs - untrimmed non-admitted NHCDC

Clinic	N	Minimum Cost	Mean Cost	Median Cost	Maximum Cost
20.13 Palliative Care	31,436	0	356	193	12,365
20.47 Rehabilitation	20,591	14	684	381	15,878
20.49 GEM	2	21	21	21	21
20.50 Psychogeriatric	1,670	0	335	352	2,928
40.12 Rehabilitation	39,378	0	152	91	4,143
40.21 Cardiac Rehabilitation	27,546	0	344	427	10,561

Table 6 Summary statistics paediatric episode/phase cost-untrimmed non-admitted NHCDC

Clinic	N	Minimum Cost	Mean Cost	Median Cost	Maximum Cost
20.13 Palliative Care	169	3	131	8	2,481
20.47 Rehabilitation	7,803	14	854	572	15,878
40.12 Rehabilitation	5,659	0	272	94	3,482
40.21 Cardiac Rehabilitation	58	49	375	427	695

3.2.1 Incorporating additional data sources

To get a more comprehensive dataset for analysis, the NHCDC data were supplemented with additional data as follows:

- Records in the PCOC dataset were matched to NHCDC admitted palliative care records to expand the geographic coverage of the data available for class finding for the admitted overnight palliative care branch of AN-SNAP V4. An additional reason for matching with PCOC data was to enable the testing of additional clinical variables that are part of the PCOC collection but are not included in the NHCDC.
- Records in the AROC dataset were matched to NHCDC admitted rehabilitation records to expand the geographic coverage of the data available for class finding for the admitted overnight rehabilitation branch of AN-SNAP V4. An additional reason for matching with AROC data was to enable the testing of additional clinical variables that are part of the AROC collection but are not included in the NHCDC.

- Paediatric subacute care data sets were provided by several facilities as there were insufficient clinical variables included in the paediatric episodes in the NHCDC.
- Data additional to that in the NHCDC were provided to the project team directly from some jurisdictions.

As a result of matching AROC and PCOC data to the NHCDC records, the number of jurisdictions represented in the initial palliative care dataset increased from two to seven, and the number of jurisdictions represented in the initial rehabilitation dataset increased from two to six. It should be noted, however, that the number of records from some jurisdictions was small.

The numbers of episodes/phases in these matched datasets with their average and CV LOS, episode/phase cost and per diem cost are presented in Table 7. It can be seen that there were fewer palliative care phases in the matched dataset than in the NHCDC linked data file. However, the number included was more than adequate to continue with the class-finding analysis and greater jurisdictional representation was considered to be more important than the loss of these additional phase records.

Table 7 Summary of the untrimmed NHCDC data matched with AROC/PCOC data

Care Type	N	Avg LOS	CV LOS	Avg Episode /phase $	CV Episode /phase $	Avg PD $	CV PD $
Palliative care	11,389	5	149	4,626	141	1,135	62
Rehabilitation	17,279	24	95	19,270	118	823	52

Regarding the paediatric data, the variables included in each of the datasets provided were very different. It was therefore not possible to combine these to form a single dataset to develop the paediatric classes.

Data from the 2013 subacute and non-admitted costing study (undertaken in 2012 on behalf of IHPA) were also provided to the project team. The admitted patient records in this dataset comprised daily costs. These had to be grouped up to create episode/phase records. After removing the episodes/phases that straddled the end points of the data collection period, there were insufficient records to use these data for class finding.

Similarly, the non-admitted records collected as part of this study were unsuitable for creating a non-admitted database to develop AN-SNAP V4 classes as they did not include the clinical variables required for testing. The lack of data from this study was a limiting factor during the class-finding process.

3.2.2 Building the analysis datasets

Not all records in the resulting datasets were suitable for class finding. For some, the cost or LOS data were incorrect and those records for which the per diem costs were outside a viable range were excluded from further analysis, as detailed below. For others, complete costs were not captured as part of the episode/phase of care fell outside the 2011/12 financial year. Same-day records were considered separately from the overnight admitted episodes/phases in the

data, as they have been classified under the ambulatory branch in all previous versions of AN-SNAP.

To ensure the admitted data were suitable for the class-finding analysis, various checks were undertaken and the data were trimmed as follows:

- Very high and very low cost episodes/phases can have an overly large influence on the class-finding process. If reported costs are inaccurate, the records should be removed from the analysis dataset. At the same time, some subacute and non-acute care episodes/phases can be very long and have a legitimately high cost. Trimming these episodes/phases can result in losing an entire class. For this reason, trimming was based on the per diem cost of the episodes/phase, as follows:
    - High trim – rehabilitation episodes and palliative care phases with a cost in excess of $3,000 per day and GEM and maintenance (non-acute) episodes that cost more than $2,000 per day were removed from the dataset.
    - Low trim – episodes/phases costing less than $300 per day were removed from the dataset.
- The dataset included costs that were incurred during the 2011/12 financial year. Some episodes/phases straddled the beginning or the end of the cost data collection period. Consequently, only part of these episodes/phases was available for analysis and they were excluded. The analysis data set therefore included episodes/phases that started and ended within the financial year. Had there been episodes/phases that started prior to 1/7/2011 and ended on or after 30/6/2012, they would also have been included to ensure some representation of those very long episodes/phases.
- Same-day admitted episodes are classified in the ambulatory branch of AN-SNAP V3. They were therefore treated separately from the primary analysis dataset for the overnight admitted branch of the classification.

Based on clinical advice received during the course of the project, it was decided to apply an additional trim to the palliative care data. Palliative care episodes comprise one or more phases. During stakeholder consultations it became evident that it was in fact a directive to record only one phase per episode in a number of hospitals. Supporting evidence was found in the data, where it was clear that some facilities had not changed a patient's phase during the episode.

The effect of this in the data would be an inappropriately increased cost and LOS of phases in these hospitals. For this reason, it was decided to exclude all hospitals that reported no multi-phase episodes. A small number of facilities that had recorded only one multi-phase episode were also excluded. This resulted in the removal of 16 facilities and 1,136 records.

The final dataset that was available for class finding is presented in Table 8. The average LOS (or phase length, for palliative care) varied greatly between the care types, as did the episode/phase cost. With regard to the average per diem cost, palliative care was the highest, followed by maintenance (non-acute). The CV measures the variability within the care type, relative to the average. It is a measure of the homogeneity of the variable of interest within the

care type. With regard to episode/phase cost, GEM is the most homogeneous with a CV of 92. This indicates that there is less variability in the episode cost of GEM patients, relative to its mean cost, when compared with the other care types.

Table 8 Summary of the trimmed analysis dataset used for class finding

Care Type	N	Avg LOS/ phase len	CV LOS/ phase len	Avg Episode /phase cost	CV Episode /phase cost	Avg PD cost	CV PD cost
Palliative care	9,497	4.5	146	4,562	136	1,151	47
Rehabilitation	14,866	23.3	79	19,468	99	833	34
Psychogeriatric	196	44.4	91	36,339	104	920	46
GEM	1,615	19.3	86	16,557	92	882	32
Maintenance/non-acute	452	27.0	115	25,582	118	987	24

3.3 Introduction of an alpha-numeric codes for AN-SNAP classes

The previous convention of numbering the AN-SNAP classes has been changed in Version 4. In earlier versions, the first digit represents the version number, the second digit represents the care type and the remaining two digits represent both the treatment setting and the specific class. These final three digits were allocated to classes sequentially at the time of the version's release. In Version 1, three-digit codes were used, with no leading digit to indicate the version number.

Using the previous convention, some confusion has arisen with the introduction of new versions of AN-SNAP. There are classes which define the same episodes in both versions, but because an earlier class has been deleted or added, the class code has shifted by a value of one. When a dataset includes episodes grouped to both versions, particularly if one of these is V1 or the leading digit has been dropped from a later version class code, it is sometimes not clear which class is indicated by a code.

The modification introduced in the draft V4 class codes will make such comparisons clearer and future development more straightforward. A six-character alphanumeric code was developed with the draft AN-SNAP V4 classes. However, there were concerns about the capacity of software systems to be updated to accommodate a code that is longer than the current four characters, within a short timeframe. Consequently, the proposed six characters have been replaced by four-character codes.

It was also suggested that the version number does not need to be included in the code, as it could be recorded in a separate field, as is the convention with data collections that include AR-DRG codes. However, currently the AN-SNAP class code is stored in one field in, for example, the NHCDC data. By including the version number in the code, there should be no confusion as to what is represented in this field. In future versions of AN-SNAP, the version number could be dropped from the code when data collection systems have been updated to accommodate the extra fields required to record the version number and multiple AN-SNAP codes separately.

The new codes comprise four alphanumeric characters, most of which represent a feature of the care or the splitting variable used to allocate the class. The first character is the version

number, while character two is alpha and depicts the care type and treatment setting. The third character is selected from a code set that is related to the specific care type and setting and the final character is the sub-group number. Details of the proposed nomenclature for AN-SNAP V4 are provided in Appendix 7.

It can be seen from the table provided at Appendix 7 that the codes break with another tradition in the way that the care types are depicted in the codes. In previous versions, the care types have been coded 1-5 for palliative care, rehabilitation, psychogeriatric care, GEM and maintenance (non-acute) respectively. These codes are not the same as those assigned in the national admitted patient data collection and the NHCDC. As AN-SNAP becomes a national collection, it is timely to address this discrepancy. As an interim measure, and to avoid confusion for users of previous versions of AN-SNAP, the care types for V4 are indicated by alpha characters in the class code. In future versions of AN-SNAP this could be changed to numeric codes that align with the other national collections.

3.4 The AN-SNAP V4 admitted classes

AN-SNAP V4 comprises 89 overnight admitted classes. In addition, in the admitted branch, there are six same-day classes, one each for the adult palliative care, paediatric palliative care, adult rehabilitation, paediatric rehabilitation, psychogeriatric and GEM branches. There is also an error class for each care type and an overarching error class for episodes where a valid care type code is missing. For branches of the classification where a limited volume of data was available, the structure of the classes has been largely driven by the stakeholder consultation process.

Paediatric classes have been introduced into AN-SNAP for the first time. All assessment-only classes have been removed from the classification. The name of the 'maintenance' care type has been changed to 'non-acute'. Some derived variables from existing collections such as 'first phase of episode' in palliative care and diagnoses of 'dementia and delirium' in the GEM classes have been introduced. In rehabilitation, a weighted sum of FIM^{TM} motor score replaces the unweighted total previously used.

The admitted AN-SNAP V4 classes are listed in Table 9. Sections 3.4.1 to 3.4.6 then provide a detailed description of the analysis undertaken during class-finding process for the overnight admitted classes in each care type and for paediatrics. As noted, the admitted branch of AN-SNAP V4 also includes six same-day classes. A separate discussion of the process leading to the inclusion of these classes is provided in Section 3.5.

Table 9 AN-SNAP V4 admitted classes

Admitted Adult Rehabilitation Classes

Code	Description
4AZ1	Weighted FIM motor score 13-18, Brain, Spine, MMT, Age ≥ 49
4AZ2	Weighted FIM motor score 13-18, Brain, Spine, MMT, Age ≤ 48
4AZ3	Weighted FIM motor score 13-18, All other impairments, Age ≥ 65
4AZ4	Weighted FIM motor score 13-18, All other impairments, Age ≤ 64
4AA1	Stroke, weighted FIM motor 51-91, FIM cognition 29-35
4AA2	Stroke, weighted FIM motor 51-91, FIM cognition 19-28
4AA3	Stroke, weighted FIM motor 51-91, FIM cognition 5-18
4AA4	Stroke, weighted FIM motor 36-50, Age ≥ 68
4AA5	Stroke, weighted FIM motor 36-50, Age ≤ 67
4AA6	Stroke, weighted FIM motor 19-35, Age ≥ 68
4AA7	Stroke, weighted FIM motor 19-35, Age ≤ 67
4AB1	Brain dysfunction, weighted FIM motor 71-91, FIM cognition 26-35
4AB2	Brain dysfunction, weighted FIM motor 71-91, FIM cognition 5-25
4AB3	Brain dysfunction, weighted FIM motor 41-70, FIM cognition 26-35
4AB4	Brain dysfunction, weighted FIM motor 41-70, FIM cognition 17-25
4AB5	Brain dysfunction, weighted FIM motor 41-70, FIM cognition 5-16
4AB6	Brain dysfunction, weighted FIM motor 29-40
4AB7	Brain dysfunction, weighted FIM motor 19-28
4AC1	Neurological conditions, weighted FIM motor 62-91
4AC2	Neurological conditions, weighted FIM motor 43-61
4AC3	Neurological conditions, weighted FIM motor 19-42
4AD1	Spinal cord dysfunction, Age ≥ 50, weighted FIM motor 42-91
4AD2	Spinal cord dysfunction, Age ≥ 50, weighted FIM motor 19-41
4AD3	Spinal cord dysfunction, Age ≤ 49, weighted FIM motor 34-91
4AD4	Spinal cord dysfunction, Age ≤ 49, weighted FIM motor 19-33
4AE1	Amputation of limb, Age ≥ 54, weighted FIM motor 68-91
4AE2	Amputation of limb, Age ≥ 54, weighted FIM motor 31-67
4AE3	Amputation of limb, Age ≥ 54, weighted FIM motor 19-30
4AE4	Amputation of limb, Age ≤ 53, weighted FIM motor 19-91
4AH1	Orthopaedic conditions, fractures, weighted FIM motor 49-91, FIM cognition 33-35
4AH2	Orthopaedic conditions, fractures, weighted FIM motor 49-91, FIM cognition 5-32
4AH3	Orthopaedic conditions, fractures, weighted FIM motor 38-48
4AH4	Orthopaedic conditions, fractures, weighted FIM motor 19-37
4A21	Orthopaedic conditions, all other (including replacements), weighted FIM motor 68-91
4A22	Orthopaedic conditions, all other (including replacements), weighted FIM motor 50-67
4A23	Orthopaedic conditions, all other (including replacements), weighted FIM motor 19-49
4A31	Cardiac, Pain syndromes, Pulmonary, weighted FIM motor 72-91
4A32	Cardiac, Pain syndromes, Pulmonary, weighted FIM motor 55-71
4A33	Cardiac, Pain syndromes, Pulmonary, weighted FIM motor 34-54
4A34	Cardiac, Pain syndromes, Pulmonary, weighted FIM motor 19-33

Code	Description
4AP1	Major Multiple Trauma, weighted FIM motor 19-91
4AR1	Reconditioning, weighted FIM motor 67-91
4AR2	Reconditioning, weighted FIM motor 50-66, FIM cognition 26-35
4AR3	Reconditioning, weighted FIM motor 50-66, FIM cognition 5-25
4AR4	Reconditioning, weighted FIM motor 34-49, FIM cognition 31-35
4AR5	Reconditioning, weighted FIM motor 34-49, FIM cognition 5-30
4AR6	Reconditioning, weighted FIM motor 19-33
4A91	All other impairments, weighted FIM motor 55-91
4A92	All other impairments, weighted FIM motor 33-54
4A93	All other impairments, weighted FIM motor 19-32
4J01	Adult Same-Day Rehabilitation
499A	Adult Overnight Rehabilitation - Ungroupable

Admitted Paediatric Rehabilitation Classes

Code	Description
4F01	Rehabilitation, Age ≤ 3
4F02	Rehabilitation, Age ≥ 4, Spinal cord dysfunction
4F03	Rehabilitation, Age ≥ 4, Brain dysfunction
4F04	Rehabilitation, Age ≥ 4, Neurological conditions
4F05	Rehabilitation, Age ≥ 4, All other impairments
4O01	Paediatric Same-Day Rehabilitation
499F	Paediatric Overnight Rehabilitation - Ungroupable

Admitted Adult Palliative Care Classes

Code	Description
4BS1	Stable phase, RUG-ADL 4-5
4BS2	Stable phase, RUG-ADL 6-16
4BS3	Stable phase, RUG-ADL 17-18
4BU1	Unstable phase, First Phase in Episode, RUG-ADL 4-13
4BU2	Unstable phase, First Phase in Episode, RUG-ADL 14-18
4BU3	Unstable phase, Not first Phase in Episode, RUG-ADL 4-5
4BU4	Unstable phase, Not first Phase in Episode, RUG-ADL 6-18
4BD1	Deteriorating phase, RUG-ADL 4-14
4BD2	Deteriorating phase, RUG-ADL 15-18, Age ≥ 75
4BD3	Deteriorating phase, RUG-ADL 15-18, Age 55-74
4BD4	Deteriorating phase, RUG-ADL 15-18, Age ≤ 54
4BT1	Terminal phase
4K01	Adult Same-Day Palliative Care
499B	Adult Overnight Palliative Care - Ungroupable

Admitted Paediatric Palliative Care Classes

Code	Description
4G01	Palliative Care, Not Terminal phase, Age < 1 year

Code	Description
4G02	Palliative Care, Stable phase, Age ≥ 1 year
4G03	Palliative Care, Unstable or Deteriorating phase, Age ≥ 1 year
4G04	Palliative Care, Terminal phase
4P01	Paediatric Same-Day Palliative Care
499G	Paediatric Overnight Palliative Care - Ungroupable

Admitted GEM Classes

Code	Description
4CH1	FIM motor 57-91 with Delirium or Dementia
4CH2	FIM motor 57-91 without Delirium or Dementia
4CM1	FIM motor 18-56 with Delirium or Dementia
4CM2	FIM motor 18-56 without Delirium or Dementia
4CL1	FIM motor 13-17 with Delirium or Dementia
4CL2	FIM motor 13-17 without Delirium or Dementia
4L01	Same-Day GEM
499C	Overnight GEM - Ungroupable

Admitted Psychogeriatric Classes

Code	Description
4DS1	HoNOS 65+ Overactive behaviour 3-4, LOS ≤ 91
4DS2	HoNOS 65+ Overactive behaviour 1-2, HoNOS 65+ ADL 4, LOS ≤ 91
4DS3	HoNOS 65+ Overactive behaviour 1-2, HoNOS 65+ ADL 0-3, LOS ≤ 91
4DS4	HoNOS 65+ Overactive behaviour 0, HoNOS 65+ total 18-48, LOS ≤ 91
4DS5	HoNOS 65+ Overactive behaviour 0, HoNOS 65+ total 0-17, LOS ≤ 91
4DL1	Long term care
4M01	Same-Day Psychogeriatric Care
499D	Overnight Psychogeriatric Care - Ungroupable

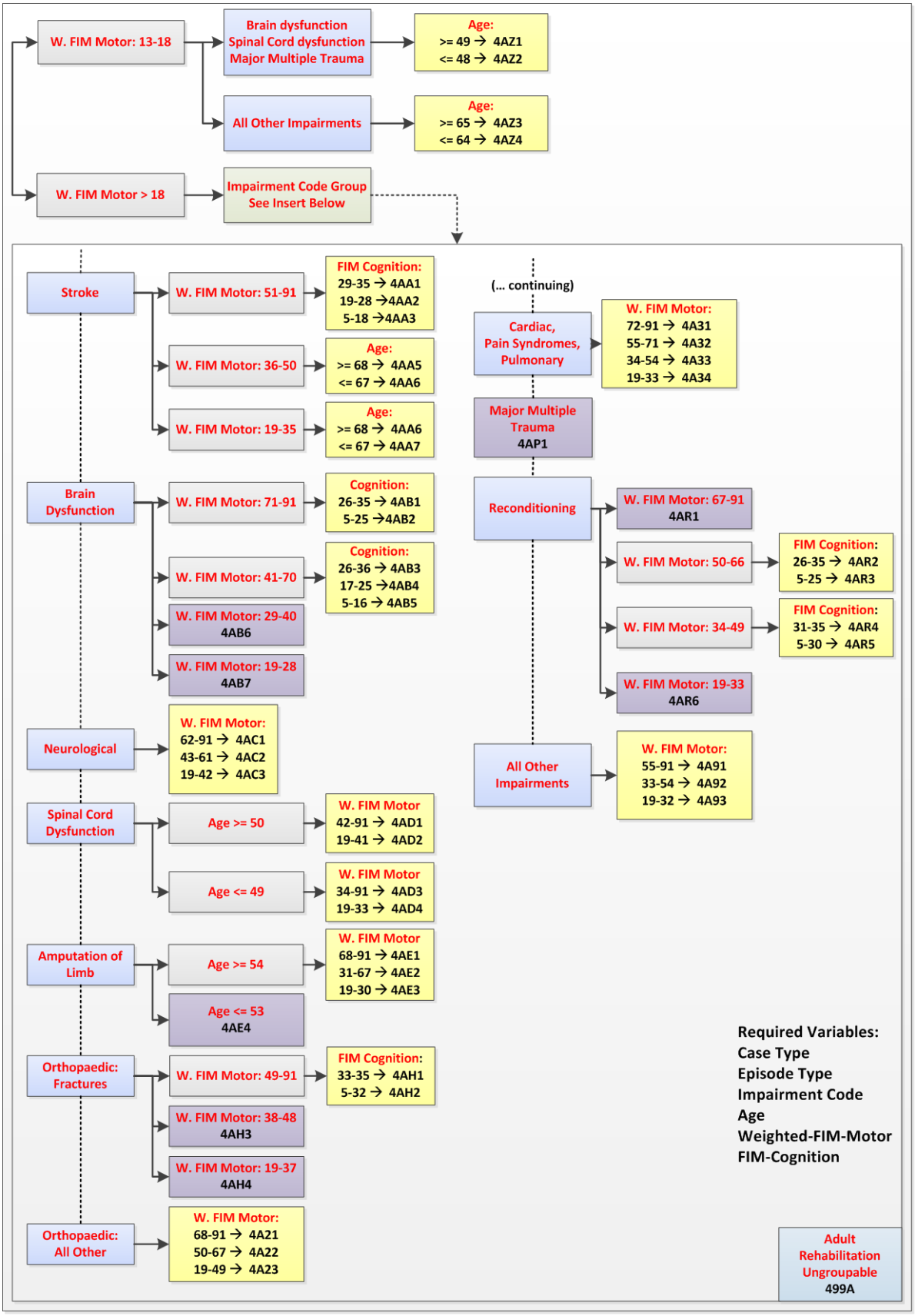
Admitted Non-Acute Care Classes

Code	Description
4ES1	Age ≥ 60, RUG-ADL 4-11, LOS ≤ 91
4ES2	Age ≥ 60, RUG-ADL 12-15, LOS ≤ 91
4ES3	Age ≥ 60, RUG-ADL 16-18, LOS ≤ 91
4ES4	Age 18-59, LOS ≤ 91
4ES5	Age ≤ 17, LOS ≤ 91
4EL1	Long term care
499E	Overnight Non-acute Care - Ungroupable

3.4.1 Admitted adult rehabilitation overnight classes

The admitted adult rehabilitation overnight branch of AN-SNAP V4 comprises 50 classes and was developed using an iterative process of statistical analysis and clinical consultation. The algorithm for the admitted adult rehabilitation overnight classes is shown in Figure 4.

Figure 4 Admitted adult rehabilitation overnight classes



Variables tested for inclusion

In the dataset, the variables that were available to test for inclusion in AN-SNAP V4 were impairment, FIM™ motor, cognition and total scores, a weighted FIM™ motor score, age, and diagnoses coded using the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM). Of these, ICD-10-AM diagnoses, finer detail of impairment and the weighted FIM™ motor score have not been used in previous versions of AN-SNAP.

Weights for FIM™ motor items were developed and tested across the classification. Several sets of weights were produced, some for the full dataset and some specific to an impairment or to a number of impairments that would be grouped together in the classification. The weights were scaled to sum to 13 so that the possible range of total motor scores was preserved. This means that, for any patient who had the same score on each of the 13 items, their weighted FIM™ motor score would be identical to the unweighted FIM™ motor score.

The variables incorporated into the final classes were those that were supported by clinical advice, performed best statistically and represented classes that had face validity.

Variables selected for the classification

The variables selected for the admitted adult rehabilitation overnight branch of AN-SNAP V4 were impairment type, FIM™ cognition, age and a weighted FIM™ motor score, all collected on admission. The set of FIM™ motor weights selected were impairment-specific. Impairments that are grouped together in the classification were assigned identical weights.

There was one exception for the derivation of impairment-specific weights. The majority of episodes of Major Multiple Trauma (MMT) formed a single class. There were, however, not enough of these episodes to be able to develop a reliable set of weights. The item weights for MMT episodes were therefore all set at 1. In other words, for MMT, an unweighted FIM™ motor score was used.

Statistically, the weighted FIM™ motor score performed better than the unweighted motor score in building the classification. At each decision point in the class-finding process, the potential splits were compared with respect to the size and average costs of the potential classes, as well as the RIV, or the proportion of the variance in cost that was explained by the split. Based on these criteria, the weighted FIM™ motor score outperformed the unweighted score consistently. For example:

- Amongst the classes for brain dysfunction, excluding those with a motor score ≤ 18, the weighted score achieved a RIV of 14.1% and the range of average costs in the resulting classes is from approximately $18,000 to $53,200. Splitting on the unweighted score achieved a RIV of 12.9% and the range of average costs in the resulting classes is from approximately $18,900 to $57,800.

- Splitting the group of impairments cardiac, pain and pulmonary using the weighted score achieved a RIV of 14.0% and identified a class with an average cost of $22,000. Using the unweighted score resulted in a RIV of 11.5% and a high-cost class of $20,600.

As successive branches were added to the classification tree, there was cumulative improvement by selecting the better-performing weighted score in preference to the unweighted. Using the weighted FIM™ has no impact on day to day clinical practice as the weight is applied within the grouper that is used to assign the AN-SNAP class.

The final decision to introduce the weighted FIM™ score into the admitted rehabilitation branch of AN-SNAP V4 was taken following the statistical analyses outlined above and extensive stakeholder consultation. In particular, the use of impairment-specific weights was considered by clinicians to be important for the weighted FIM™ scores to be clinically meaningful.

The weights are presented in Table 10 where they have been rounded to a single decimal place. In the calculation of the weighted FIM™ motor score, more decimal places were used and the result rounded to the nearest integer for assignment to a class.

Table 10 Impairment-specific FIM™ item weights for admitted adult rehabilitation overnight classes

Impairment Group	FIM eat	FIM grm	FIM bath	FIM upp	FIM low	FIM toil	FIM blad	FIM bow	FIM xfer	FIM xftlt	FIM tub	FIM walk	FIM stair
Stroke	1.0	1.0	1.2	1.0	1.1	1.1	0.8	0.8	1.1	1.1	1.1	1.0	0.6
Brain Dys	1.5	1.3	1.3	1.1	0.9	1.0	0.9	1.0	0.9	1.0	1.0	0.8	0.3
Neuro Conditions	1.1	1.2	1.2	0.8	0.9	1.1	0.7	0.8	1.1	1.2	1.3	0.9	0.6
Spinal Cord Dys	0.9	0.8	1.2	0.8	0.9	1.2	0.8	0.8	1.1	1.5	1.5	0.2	1.1
Amp of Limb	1.2	0.8	1.3	0.6	0.7	1.0	0.2	0.4	1.3	1.0	1.0	0.7	2.7
Arthritis	0.8	0.8	1.2	0.9	1.2	1.0	0.7	0.8	1.6	1.2	1.5	0.8	0.6
Pain Syndromes	1.0	1.0	1.3	0.7	0.9	1.1	0.8	0.8	1.4	1.3	1.5	0.8	0.4
Ortho Conds - Fract	0.9	0.9	1.2	0.7	0.9	1.1	0.8	1.1	1.4	1.3	1.3	0.8	0.5
Ortho Cond - Repl	1.2	0.9	1.2	0.8	1.0	1.1	0.7	1.0	1.4	1.2	1.3	0.7	0.5
Ortho Cond - Other	1.2	0.9	1.2	0.8	1.0	1.1	0.7	1.0	1.4	1.2	1.3	0.7	0.5
Cardiac	1.0	1.0	1.3	0.7	0.9	1.1	0.8	0.8	1.4	1.3	1.5	0.8	0.4
Pulmonary	1.0	1.0	1.3	0.7	0.9	1.1	0.8	0.8	1.4	1.3	1.5	0.8	0.4
Burns	0.8	0.8	1.2	0.9	1.2	1.0	0.7	0.8	1.6	1.2	1.5	0.8	0.6
Congen Deform	0.8	0.8	1.2	0.9	1.2	1.0	0.7	0.8	1.6	1.2	1.5	0.8	0.6
Oth Disabling Imps	0.8	0.8	1.2	0.9	1.2	1.0	0.7	0.8	1.6	1.2	1.5	0.8	0.6
MMT	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Devel Disabs	0.8	0.8	1.2	0.9	1.2	1.0	0.7	0.8	1.6	1.2	1.5	0.8	0.6
Reconditioning	1.1	0.9	1.2	0.7	0.9	1.1	0.8	0.9	1.3	1.3	1.3	0.9	0.5

NOTE: Because the values in this table have been rounded, each row may not sum exactly to 13.

Classes

In AN-SNAP V3, the first split is on assessment-only. The remaining episodes are then split on FIM™ motor score. If this score is 13, the episodes go to one of two classes which are defined by impairment type. If FIM™ motor >13, the next split is on impairment.

Based on clinical advice, the assessment-only class has been removed from the rehabilitation branch in AN-SNAP V4. Instead, the first split is at a low FIM™ weighted motor score. The split FIM™ weighted motor ≤ 18 was found to perform better statistically than a split at FIM™ motor = 13 and was supported by clinicians.

The next split is on impairment. The clinical committee suggested combining the pain, cardiac and pulmonary impairment types into a single branch in AN-SNAP V4, as the treatment of these patients is clinically very similar. This approach was supported by subsequent statistical analysis. This combined group has been split using weighted FIM™ motor score. The largest of the resulting groups was further split using age.

Another suggestion from the clinicians was to combine fractures, replacements and other orthopaedic conditions into one set of orthopaedic classes. This was partly supported by subsequent statistical analysis which showed little difference between the costs of replacements and other orthopaedic conditions. However, fractures were found to be more expensive. Consequently, a set of classes has been developed for fractures and another set for replacements and other orthopaedic conditions.

The impairment types arthritis, burns, congenital deformities, developmental disabilities and other disabling impairments have been grouped together into one branch of AN-SNAP V4. They have been split using the weighted FIM™ motor score. Each of the other impairment types defines a separate branch.

The admitted adult rehabilitation overnight branch of AN-SNAP V4 comprises 50 classes, as seen in Table 11. Other than minor changes to FIM™ motor and age splits which were introduced to improve statistical performance and clinical relevance, the major changes from V3 are the removal of the assessment-only class, the introduction of the weighted FIM™ motor score and the impairment groupings described above.

An early decision in the development of the rehabilitation classes meant that impairment was required for all episodes. The impairment type was missing for 408 records in the analysis dataset that had been built as described previously. These records have therefore not been included in the table below.

It can be seen in this table that within branches, for example those defined by impairment group, there is a broad range of average episode costs across the classes. Another point to note is the CV of each class. The CV is a measure of the variability within the class, with respect to the mean. The smaller the CV, the more homogeneous is the class. A CV that is less than 100 is considered to indicate reasonable homogeneity of costs within a class.

Table 11 AN-SNAP V4 admitted adult rehabilitation overnight classes

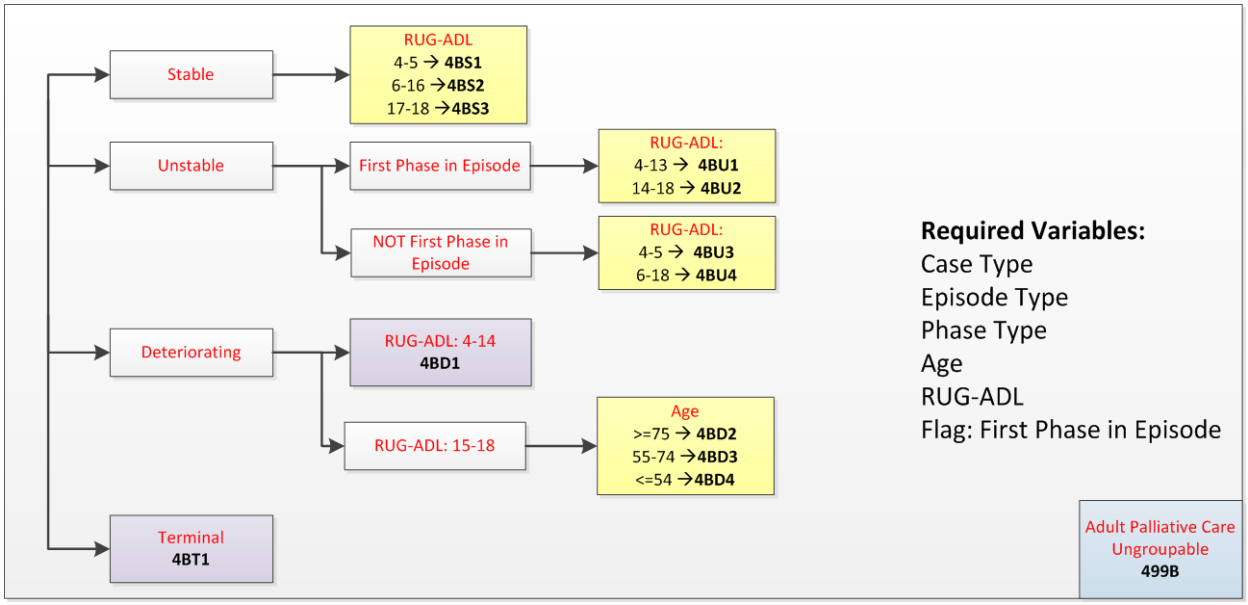
Code	Description	N	Avg LOS	CV LOS	Avg Ep $	CV Ep $	Avg PD $	CV PD $
4AZ1	Weighted FIM motor score 13-18, Brain, Spine, MMT, Age ≥ 49	87	58.3	81	57,427	94	1,023	47
4AZ2	Weighted FIM motor score 13-18, Brain, Spine, MMT, Age ≤ 48	68	60.1	83	85,626	102	1,425	43
4AZ3	Weighted FIM motor score 13-18, All other impairments, Age ≥ 65	362	32.6	70	28,355	80	863	31
4AZ4	Weighted FIM motor score 13-18, All other impairments, Age ≤ 64	115	52.4	71	48,677	86	954	35
4AA1	Stroke, weighted FIM motor 51-91, FIM cognition 29-35	613	16.6	64	14,247	79	874	35
4AA2	Stroke, weighted FIM motor 51-91, FIM cognition 19-28	477	21.0	63	17,672	65	867	32
4AA3	Stroke, weighted FIM motor 51-91, FIM cognition 5-18	161	26.6	69	22,038	71	856	29
4AA4	Stroke, weighted FIM motor 36-50, Age ≥ 68	313	30.5	60	24,608	65	829	30
4AA5	Stroke, weighted FIM motor 36-50, Age ≤ 67	116	34.6	67	30,722	70	900	30
4AA6	Stroke, weighted FIM motor 19-35, Age ≥ 68	308	38.4	60	31,975	66	862	32
4AA7	Stroke, weighted FIM motor 19-35, Age ≤ 67	163	52.4	60	44,582	67	884	33
4AB1	Brain dysfunction, weighted FIM motor 71-91, FIM cognition 26-35	134	13.1	50	12,801	58	980	33
4AB2	Brain dysfunction, weighted FIM motor 71-91, FIM cognition 5-25	156	22.2	70	22,541	71	1,056	38
4AB3	Brain dysfunction, weighted FIM motor 41-70, FIM cognition 26-35	98	20.9	53	18,248	56	893	34
4AB4	Brain dysfunction, weighted FIM motor 41-70, FIM cognition 17-25	113	26.1	57	25,652	64	1,017	40
4AB5	Brain dysfunction, weighted FIM motor 41-70, FIM cognition 5-16	71	36.5	71	37,893	102	1,021	43
4AB6	Brain dysfunction, weighted FIM motor 29-40	54	39.5	65	38,623	79	990	39
4AB7	Brain dysfunction, weighted FIM motor 19-28	48	43.0	64	53,210	93	1,151	48
4AC1	Neurological conditions, weighted FIM motor 62-91	270	17.2	73	14,481	77	855	36
4AC2	Neurological conditions, weighted FIM motor 43-61	217	24.3	61	18,911	63	802	34
4AC3	Neurological conditions, weighted FIM motor 19-42	160	37.1	79	30,183	78	839	31
4AD1	Spinal cord dysfunction, Age ≥ 50, weighted FIM motor 42-91	99	25.9	68	23,323	88	898	45
4AD2	Spinal cord dysfunction, Age ≥ 50, weighted FIM motor 19-41	119	48.7	78	51,739	110	1,048	53
4AD3	Spinal cord dysfunction, Age ≤ 49, weighted FIM motor 34-91	93	35.5	61	36,550	71	1,058	39
4AD4	Spinal cord dysfunction, Age ≤ 49, weighted FIM motor 19-33	46	61.5	76	54,937	82	926	41
4AE1	Amputation of limb, Age ≥ 54, weighted FIM motor 68-91	33	16.1	61	13,397	61	888	44
4AE2	Amputation of limb, Age ≥ 54, weighted FIM motor 31-67	305	30.4	61	24,443	69	833	37
4AE3	Amputation of limb, Age ≥ 54, weighted FIM motor 19-30	33	39.0	54	34,235	65	897	38
4AE4	Amputation of limb, Age ≤ 53, weighted FIM motor 19-91	92	24.8	70	21,202	86	846	40
4AH1	Orthopaedic conditions, fractures, weighted FIM motor 49-91, FIM cognition 33-35	978	18.1	59	13,553	65	757	30

Code	Description	N	Avg LOS	CV LOS	Avg Ep $	CV Ep $	Avg PD $	CV PD $
4AH2	Orthopaedic conditions, fractures, weighted FIM motor 49-91, FIM cognition 5-32	1,015	21.4	54	16,144	58	770	29
4AH3	Orthopaedic conditions, fractures, weighted FIM motor 38-48	669	26.5	56	20,249	60	785	34
4AH4	Orthopaedic conditions, fractures, weighted FIM motor 19-37	526	30.6	57	24,178	67	799	32
4A21	Orthopaedic conditions, all other (including replacements), weighted FIM motor 68-91	679	12.2	48	9,763	52	804	24
4A22	Orthopaedic conditions, all other (including replacements), weighted FIM motor 50-67	1,173	15.7	50	12,010	57	765	25
4A23	Orthopaedic conditions, all other (including replacements), weighted FIM motor 19-49	381	24.0	57	19,036	62	821	32
4A31	Cardiac, Pain syndromes, Pulmonary, weighted FIM motor 72-91	207	11.9	50	9,072	53	775	26
4A32	Cardiac, Pain syndromes, Pulmonary, weighted FIM motor 55-71	456	16.7	58	12,742	65	765	26
4A33	Cardiac, Pain syndromes, Pulmonary, weighted FIM motor 34-54	249	21.6	56	16,366	58	781	31
4A34	Cardiac, Pain syndromes, Pulmonary, weighted FIM motor 19-33	66	27.2	68	21,993	75	819	27
4AP1	Major Multiple Trauma, weighted FIM motor 19-91	93	29.5	81	24,473	78	880	43
4AR1	Reconditioning, weighted FIM motor 67-91	824	15.4	64	12,353	67	816	31
4AR2	Reconditioning, weighted FIM motor 50-66, FIM cognition 26-35	920	18.5	58	14,888	63	823	31
4AR3	Reconditioning, weighted FIM motor 50-66, FIM cognition 5-25	290	22.4	63	19,215	65	881	30
4AR4	Reconditioning, weighted FIM motor 34-49, FIM cognition 31-35	195	21.6	56	17,433	60	836	32
4AR5	Reconditioning, weighted FIM motor 34-49, FIM cognition 5-30	464	24.9	63	21,758	66	891	30
4AR6	Reconditioning, weighted FIM motor 19-33	361	29.1	70	26,394	74	918	27
4A91	All other impairments, weighted FIM motor 55-91	231	17.7	64	13,440	59	781	24
4A92	All other impairments, weighted FIM motor 33-54	134	24.4	64	18,149	69	737	28
4A93	All other impairments, weighted FIM motor 19-32	31	34.5	70	26,513	83	756	29
All		14,866	23.3	79	19,468	99	833	34

3.4.2 Admitted adult palliative care overnight classes

The admitted adult palliative care overnight branch of AN-SNAP V4 comprises 12 classes and was developed using an iterative process of statistical analysis and clinical consultation. There was strong clinical support for these classes. The algorithm for the admitted adult palliative care overnight classes is shown in Figure 5.

Figure 5 Admitted adult palliative care overnight classes



Variables tested for inclusion

In the dataset, the variables that were available to test for inclusion in the palliative care branch of AN-SNAP V4 were phase, RUG-ADL score, Palliative Care Problem Severity Score (PCPSS), Symptom Assessment Scale, the Australian-modified Karnofsky Performance Status Scale, age and a selection of procedures and diagnoses. Of these, the diagnosis variables and the clinical measures, other than RUG-ADL, have not previously been used in the overnight admitted branch of AN-SNAP. The diagnoses tested were delirium, spinal cord compression, bowel obstruction, neuropathic pain, chronic pain, refractory or progressive dyspnoea, motor neuron disease, nutritional support and respiratory support, as suggested by the clinical committee.

The variables incorporated into the final classes were those that were supported by clinical advice, performed best statistically and represented classes that had face validity.

Classes

In previous versions of AN-SNAP the first split is on assessment-only. The remaining episodes are then split on palliative care phase. On the advice of the clinical committee, the assessment-only class has been removed, meaning that phase is the first split in the admitted palliative care branch of AN-SNAP V4.

Within the unstable phase, a derived variable ‘first phase in episode’ has been introduced as a splitting variable. This variable applies when an unstable phase is the first phase in an admitted palliative care episode. The corresponding variable, ‘not first phase in episode’, applies when an unstable phase is the second or subsequent phase of an admitted palliative care episode. The use of this variable divides the unstable phase into a group with an average phase length of two days and another with an average phase length of four days.

In previous versions of AN-SNAP, the bereavement phase formed its own class. In practice, the use of this class has been problematic when reconciling AN-SNAP and other information systems where an AN-SNAP episode remains open for days or weeks after the death of a patient. The clinical committee agreed that bereavement support services need to be recognised. However, they are best addressed through mechanisms such as payment loadings being applied to episodes where a patient dies rather than through the classification itself. On this basis, the bereavement class has been removed from the AN-SNAP V4. This is consistent with the approach adopted in the paediatric palliative care classes.

Two other changes have been introduced to the admitted adult palliative care overnight classes. Firstly, RUG-ADL splits have been revised in the stable and unstable phases and removed from the terminal phase class. Secondly, the age split in the deteriorating phase has been modified.

The admitted adult palliative care overnight classes are presented in Table 12 with the number in each class as well as the average and CV of LOS, phase cost and per diem cost. Palliative care is classified at the phase level. With length of phase and cost of phase both varying, it is perhaps easiest to see the viability of the classes from the per diem costs. As expected, these are higher for the terminal phase and for the unstable and deteriorating phases where the intensity of treatment is often higher.

The classes are certainly homogeneous with respect to per diem cost, but less so with respect to phase cost. However, before applying any of the splits, the phase cost CV was 136. Almost all of the classes have a phase cost CV that is less than this value. Although it is ideal for the class CVs to be less than 100, this is not always achieved in most classification systems. For example, it would not be unusual for a DRG system to have CVs greater than 100 for about one-third of its classes.

The changes for AN-SNAP V4 have been driven primarily by clinical advice and were supported by statistical analyses. The new classes generally had slightly lower CVs and higher separation of average costs when compared with the Version 3 classes.

Table 12 AN-SNAP V4 admitted adult palliative care overnight classes

Code	Description	N	Avg Phs Len	CV Phs Len	Avg Phs $	CV Phs $	Avg PD $	CV PD $
4BS1	Stable phase, RUG-ADL 4-5	645	7.7	130	6,449	130	990	46
4BS2	Stable phase, RUG-ADL 6-16	1,172	7.5	130	6,681	120	1,066	45
4BS3	Stable phase, RUG-ADL 17-18	486	6.4	140	5,905	160	1,062	51
4BU1	Unstable phase, First Phase in Episode, RUG-ADL 4-13	1,275	4.8	112	5,249	120	1,087	42
4BU2	Unstable phase, First Phase in Episode, RUG-ADL 14-18	928	4.0	123	4,338	120	1,074	44
4BU3	Unstable phase, Not first Phase in Episode, RUG-ADL 4-5	155	3.2	96	3,697	100	1,222	42
4BU4	Unstable phase, Not first Phase in Episode, RUG-ADL 6-18	909	2.8	112	3,264	110	1,238	45
4BD1	Deteriorating phase, RUG-ADL 4-14	852	4.7	121	4,876	126	1,138	46
4BD2	Deteriorating phase, RUG-ADL 15-18, Age ≥ 75	825	3.3	134	3,593	143	1,164	48

Code	Description	N	Avg Phs Len	CV Phs Len	Avg Phs $	CV Phs $	Avg PD $	CV PD $
4BD3	Deteriorating phase, RUG-ADL 15-18, Age 55-74	605	3.9	146	4,504	129	1,260	43
4BD4	Deteriorating phase, RUG-ADL 15-18, Age ≤ 54	129	3.2	109	3,600	94	1,286	53
4BT1	Terminal phase	1,516	2.1	102	2,570	103	1,298	50
All		**9,497**	**4.5**	**146**	**4,562**	**136**	**1,151**	**47**

There is an important point to be made about the heterogeneity of the palliative care data. Not all jurisdictions have perfected their costing systems to the extent that costs are assigned at the level of phase. This would lead to a degree of noise in the data that masks any underlying structures.

For this reason, the data within each class have been trimmed using the standard nonparametric criteria involving the interquartile range (IQR) of the phase cost. This method identifies outliers as any phase with a cost that is higher than one and a half times the IQR above the third quartile, or less than one and a half times the IQR below the first quartile.

Overall, 7% of records were removed from the dataset as a result of this trim. Its effect on the average phase cost, per diem cost and LOS of each class can be seen in Table 13. All phase costs have reduced and their CVs are less than 100. However, there has been little change in the average per diem costs.

Table 13 AN-SNAP V4 admitted adult palliative care overnight classes after IQR trim

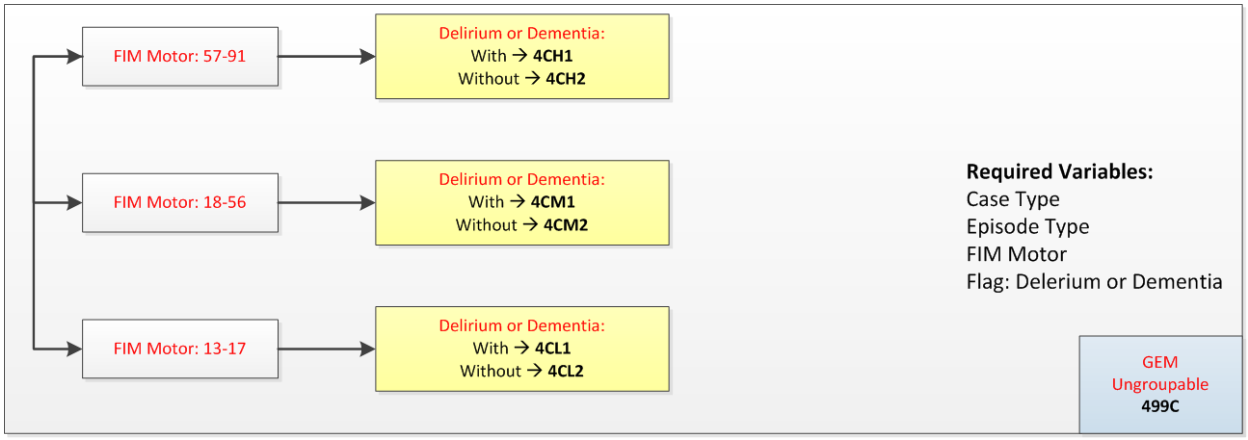
Code	Description	N	Avg Phs Len	CV Phs Len	Avg Phs $	CV Phs $	Avg PD $	CV PD $
4BS1	Stable phase, RUG-ADL 4-5	595	5.8	119	4,575	86	987	47
4BS2	Stable phase, RUG-ADL 6-16	1,088	5.6	107	4,957	86	1,072	45
4BS3	Stable phase, RUG-ADL 17-18	447	4.6	121	3,820	89	1,056	53
4BU1	Unstable phase, First Phase in Episode, RUG-ADL 4-13	1,172	3.7	88	3,753	84	1,067	44
4BU2	Unstable phase, First Phase in Episode, RUG-ADL 14-18	851	2.9	83	3,030	86	1,053	46
4BU3	Unstable phase, Not first Phase in Episode, RUG-ADL 4-5	140	2.4	77	2,673	75	1,212	44
4BU4	Unstable phase, Not first Phase in Episode, RUG-ADL 6-18	859	2.3	84	2,613	76	1,236	46
4BD1	Deteriorating phase, RUG-ADL 4-14	798	3.7	90	3,717	82	1,134	47
4BD2	Deteriorating phase, RUG-ADL 15-18, Age ≥ 75	755	2.3	86	2,450	78	1,155	50
4BD3	Deteriorating phase, RUG-ADL 15-18, Age 55-74	557	2.8	93	3,270	81	1,262	44
4BD4	Deteriorating phase, RUG-ADL 15-18, Age ≤ 54	120	2.6	98	2,921	79	1,293	54
4BT1	Terminal phase	1,418	1.7	71	2,053	68	1,284	51
All		**8,800**	**3.4**	**117**	**3,332**	**91**	**1,143**	**49**

3.4.3 Admitted GEM overnight classes

The overnight admitted GEM branch of AN-SNAP V4 comprises six classes and was developed using an iterative process of statistical analysis and clinical consultation. Feedback from various stakeholders also led to the removal of a long term care class that had been included in the

draft version of the classification. The algorithm for the admitted GEM overnight classes is shown in Figure 6.

Figure 6 Admitted GEM overnight classes



Additional data

An additional source of data for the GEM branch of the classification was a large dataset from one jurisdiction. This dataset was analysed separately from the NHCDC data for two reasons. One reason was that this new dataset was much larger than the available NHCDC extract and could potentially have severely biased the results. The other is that it was considered preferable to use data from more than one jurisdiction if at all possible. However, by analysing the datasets separately, each was able to contribute to the final decision about the V4 classes.

Variables tested for inclusion

In the dataset, the variables that were available to test for inclusion in AN-SNAP V4 were FIM™ motor, cognition and total scores, age, and ICD-10-AM diagnoses. Of these, only ICD-10-AM diagnosis had not been used in previous versions of AN-SNAP.

A number of diagnoses were identified as potentially having an impact on the cost of the episode of care. The selected diagnoses had been identified by clinicians and supported in the literature as being relevant to what has been called the 'geriatric syndrome'. They were dementia, delirium, malnutrition, history of stroke, multiple system disorders, incontinence, falls, cognitive issues and other signs and symptoms.

The variables incorporated into the final classes were those that were supported by clinical advice, performed best statistically and represented classes that had face validity.

Classes

In the previous version of AN-SNAP, the first class was based on the variable 'assessment-only'. As discussed previously, based on clinical advice, this class has been removed from AN-SNAP V4.

In previous versions of AN-SNAP, FIM™ cognition scores have been used as splitting variables with age and FIM™ motor scores. In general, geriatricians identified that the FIM™ cognition sub-scale is not useful in a clinical context. For this reason, it is not included in the AN-SNAP V4 admitted GEM overnight classes.

Advice to the project team was that, from a clinical perspective, the preferred structure for the GEM branch of AN-SNAP V4 was a first split on the FIM™ motor score, followed by a split on diagnosis. The statistical analysis supported this and the final classes, seen in Table 14, incorporate FIM™ motor splits followed by splits on dementia and delirium.

There is a good differentiation of average episode costs between the classes. In particular, within each of the FIM™ motor groups, the subsequent split using diagnoses of dementia or delirium has resulted in classes with substantially different costs. Another feature to note is the episode cost CV of each class. With only one exception, they are less than the overall CV of 92.

The draft version of this branch included a class for long term care. This class was added after analysis of the larger single-jurisdiction dataset identified a set of patients who had stayed in hospital for psychosocial reasons, for example, or because of the difficulty in finding a placement for ongoing care. When it was understood that these long-stay episodes could perhaps have been categorised as maintenance (non-acute), a long term care class was added to the GEM admitted branch to align it with the non-acute branch. The inclusion of this class was supported by both the clinical committee and the available GEM data.

However, following subsequent feedback from stakeholders, this long term care class has been removed. Developing business rules around care type changes was seen as a better way to ensure that episodes are appropriately classified than building equivalent classes into different branches of the classification.

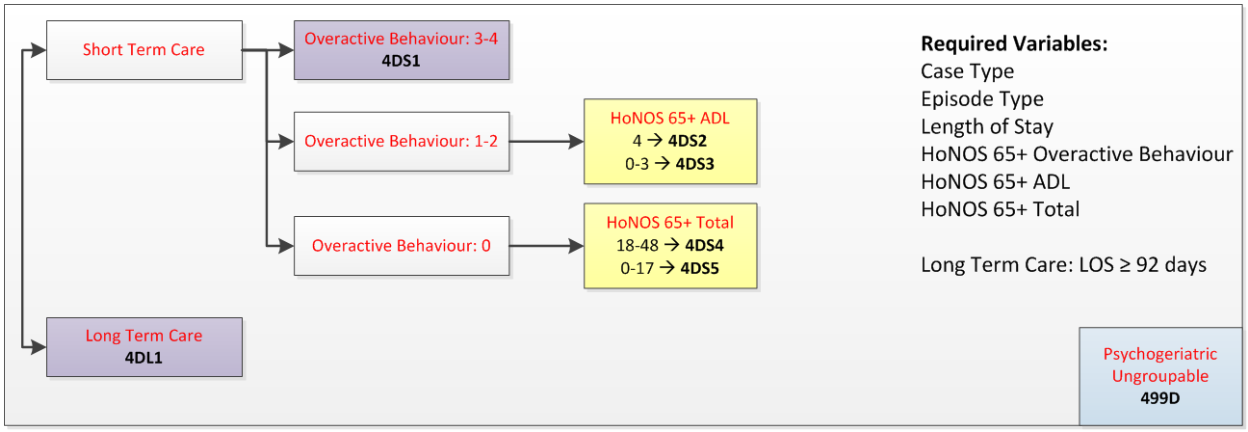
Table 14 AN-SNAP V4 admitted GEM overnight classes

Code	Description	N	Avg LOS	CV LOS	Avg Ep $	CV Ep $	Avg PD $	CV PD $
4CH1	FIM motor 57-91 with Delirium or Dementia	109	16.6	81	15,368	81	955	28
4CH2	FIM motor 57-91 without Delirium or Dementia	486	14.5	78	12,046	87	834	33
4CM1	FIM motor 18-56 with Delirium or Dementia	201	21.5	76	19,315	80	940	32
4CM2	FIM motor 18-56 without Delirium or Dementia	677	20.2	72	16,791	74	860	31
4CL1	FIM motor 13-17 with Delirium or Dementia	54	36.8	85	35,982	88	1,033	28
4CL2	FIM motor 13-17 without Delirium or Dementia	88	25.8	117	22,924	117	995	34
All		1,615	19.3	86	16,557	92	882	32

3.4.4 Admitted psychogeriatric overnight classes

The admitted psychogeriatric overnight branch of AN-SNAP V4 comprises six classes. As noted, only one change was made to this branch with the removal of the ‘assessment-only’ class. The algorithm for the admitted psychogeriatric care overnight classes is shown in Figure 7.

Figure 7 Admitted psychogeriatric overnight classes



The initial scope of the project included reviewing the psychogeriatric branch of the classification. However, as the project evolved, it was agreed with IHPA that this component of the project would be very limited.

In part, this decision was made in recognition of the fact that a program of work is currently being undertaken by IHPA that will result in the development of a classification for use in the mental health sector. It was agreed that further refinement of the psychogeriatric AN-SNAP classes should be reconsidered when the approach being taken in the mental health classification work has been decided. Indeed, some, but not all, stakeholders were of the view that the long term care class is unnecessary and should be removed, despite 10% of episodes falling into this class. However, it was decided to leave the class in AN-SNAP V4 and leave any changes for the future when they can be based on the outcome of the mental health work program.

The other reason for not undertaking a full review of the psychogeriatric branch of AN-SNAP was that the number of psychogeriatric episodes available for analysis was small. In the cost data file available for analysis there were only 2,010 psychogeriatric records and less than 12% of these had associated clinical data. In addition, the only clinical items available for analysis were diagnosis and intervention codes. Much of the discussion with the clinical panel centred on the overlap between the psychogeriatric and GEM care types and the overlap between the psychogeriatric and mental health care types.

Accordingly, as shown in Table 15 only one change has been made to the admitted psychogeriatric overnight branch in AN-SNAP V4. The 'assessment-only' class has been removed based on the advice of the clinical panel. Other than this change, the AN-SNAP V4 classes are the same as AN-SNAP V3 and are based on LOS and HoNOS scores.

Table 15 AN-SNAP V4 admitted psychogeriatric overnight classes

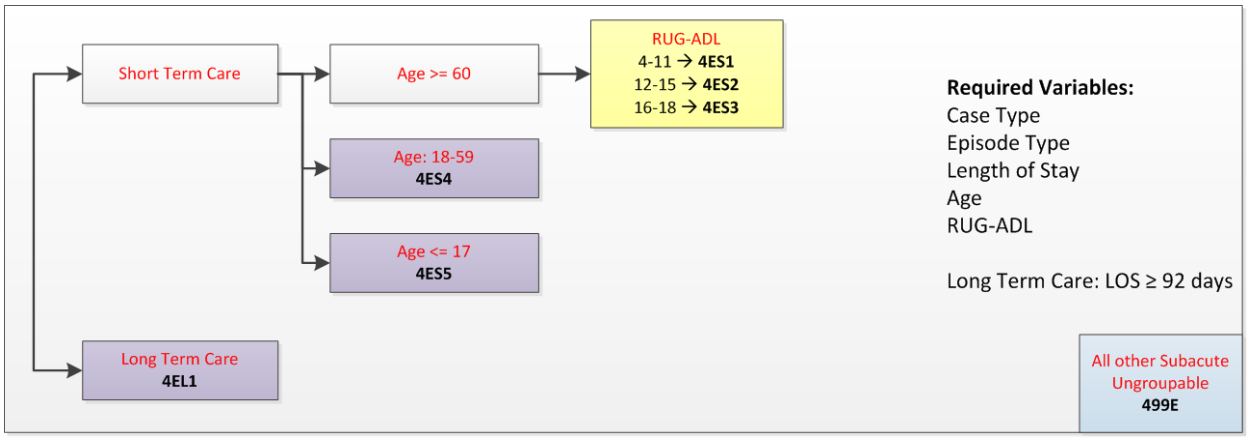
Code	Description	N	Avg LOS	CV LOS	Avg Ep $	CV Ep $	Avg PD $	CV PD $
4DS1	HoNOS 65+ Overactive behaviour 3-4, LOS ≤ 91	95	34.0	72	30,679	76	1,043	47
4DS2	HoNOS 65+ Overactive behaviour 1-2, HoNOS 65+ ADL 4, LOS ≤ 91	5	30.4	108	17,064	83	650	40

Code	Description	N	Avg LOS	CV LOS	Avg Ep $	CV Ep $	Avg PD $	CV PD $
4DS3	HoNOS 65+ Overactive behaviour 1-2, HoNOS 65+ ADL 0-3, LOS ≤ 91	31	40.6	62	34,585	67	847	25
4DS4	HoNOS 65+ Overactive behaviour 0, HoNOS 65+ total 18-48, LOS ≤ 91	29	38.9	53	30,303	68	825	36
4DS5	HoNOS 65+ Overactive behaviour 0, HoNOS 65+ total 0-17, LOS ≤ 91	17	28.9	173	23,409	198	882	56
4DL1	Long term care	19	128.6	33	93,352	78	671	41
All		196	44.4	91	36,339	104	920	46

3.4.5 Admitted non-acute overnight classes

The admitted non-acute overnight branch of AN-SNAP V4 comprises six classes and was developed using an iterative process of statistical analysis and clinical consultation. The algorithm for the admitted non-acute overnight classes is shown in Figure 8.

Figure 8 Admitted non-acute overnight classes



During the initial project consultations, several stakeholders raised the importance of reviewing the maintenance (non-acute) care type. In particular, it was suggested that the AN-SNAP classes do not reflect modern therapeutic/restorative clinical practices associated with this care type. Instead, they reflect an outdated approach of considering non-acute patients as simply occupying a bed whilst waiting to be discharged.

Each of the five clinical committees reviewed the AN-SNAP V3 maintenance care (non-acute) classes as this care type applies across all clinical disciplines. The result was a succession of decisions that built on one another, until all panels agreed on a single set of classes for V4. Based on the clinical views expressed and an analysis of available data, three major changes have been made for this care type in AN-SNAP V4.

Firstly, the name of the branch in the classification has been changed from ‘maintenance’ to ‘non-acute’ to better reflect current clinical language. This has potential flow-on effects where the care type nomenclature ‘maintenance‘ is used in other contexts. Secondly, the variable ‘maintenance type’ (which comprises: ‘respite’, ‘nursing home type’, ‘convalescent’ and ‘other’) has been removed from the classification to better reflect current clinical practices. Finally,

there are no non-admitted non-acute classes In AN-SNAP V4 on the basis that this care is no longer provided in non-admitted settings.

Variables tested for inclusion

Throughout the consultation for this project, the consistent advice about the current maintenance (non-acute) classes was that the categories in the variable Maintenance Type were out of date. In fact it was agreed that the name 'maintenance' should be changed. Some categories of the Maintenance Type variable were not used in the data available for analysis – there were no data at all for the convalescent care category and only one record was coded as respite. However there were reasonable numbers in the other groups.

An early suggestion from clinicians was to try to develop classes for AN-SNAP V4 based on age and RUG-ADL. However, no reasonable classes based on just the two variables RUG-ADL and age could be found.

The variables incorporated into the final classes were those that were supported by clinical advice, performed best statistically and represented classes that had face validity.

Classes

In the end, a reasonable set of classes was found when episodes in the long term care category of the Maintenance Type were separated out as a group, even though there were few of these records, and the remaining episodes were split into categories based on age and RUG-ADL, as seen in Table 16.

This approach was entirely consistent with clinical advice that there is a small group of patients who remain in hospital for social reasons, such as home or family circumstances, or because the complexity of their ongoing health needs make it very difficult to find alternative accommodation for them. Ideally, they would be identified by codes in the data that indicate their ongoing needs, rather than their LOS. However, the advice received was that, where such codes exist, their use is inconsistent between and within jurisdictions.

Advice provided by stakeholders regarding the inclusion of this long term care class was mixed. There was a view that, when the classification is used for funding, the class is unnecessary. There was also the view that the class should be retained when the classification is used for other purposes. As a result, this class has been retained in AN-SNAP V4.

Of the paediatric patients classified with a maintenance (non-acute) care type, several would fit into the long term care class. For those paediatric patients who have a shorter stay in hospital, an appropriate age split was added.

Table 16 AN-SNAP V4 admitted non-acute overnight classes

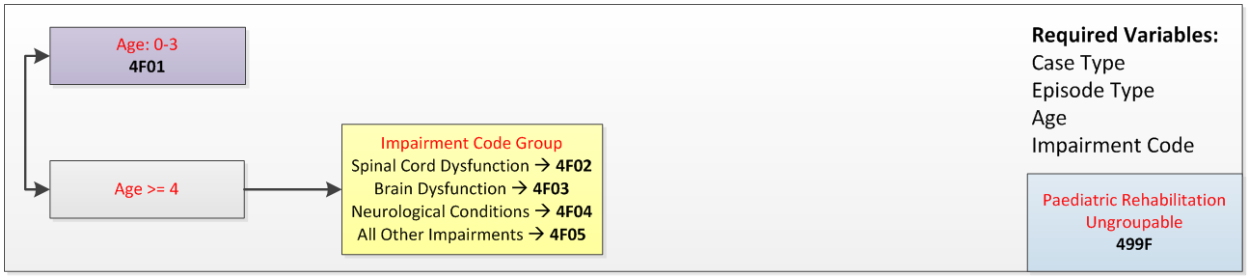
Code	Description	N	Avg LOS	CV LOS	Avg Ep $	CV Ep $	Avg PD $	CV PD $
4ES1	Age ≥ 60, RUG-ADL 4-11, LOS ≤ 91	277	21.1	87	19,546	83	975	22
4ES2	Age ≥ 60, RUG-ADL 12-15, LOS ≤ 91	92	24.9	76	25,323	75	1,032	18
4ES3	Age ≥ 60, RUG-ADL 16-18, LOS ≤ 91	33	12.1	88	11,150	76	968	24
4ES4	Age 18-59, LOS ≤ 91	28	30.1	72	29,221	71	1,052	28
4ES5	Age ≤ 17, LOS ≤ 91							
4EL1	Long term care	22	128.9	40	120,530	51	922	26
All		452	27.0	115	25,582	118	987	24

3.4.6 Admitted paediatric overnight classes

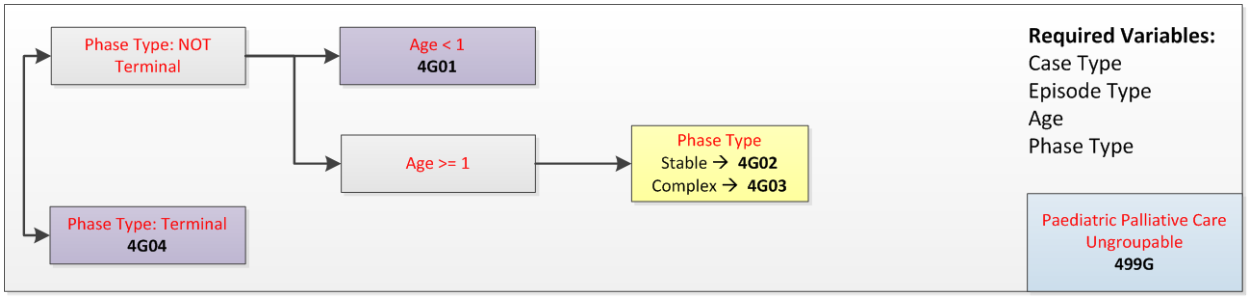
The admitted paediatric overnight branch of AN-SNAP V4 comprises nine classes (four palliative care and five rehabilitation). The algorithm for the overnight paediatric classes is shown in Figure 9.

Figure 9 Admitted paediatric overnight classes

Admitted paediatric rehabilitation overnight classes



Admitted paediatric palliative care overnight classes



Overview of the paediatric AN-SNAP classes

Few data records were available to support the development of paediatric classes. Several paediatric services subsequently provided a limited volume of data. However, the development of AN-SNAP V4 paediatric classes has been based primarily on clinical advice rather than detailed statistical data analyses.

Four palliative care classes, five paediatric rehabilitation classes and one non-acute paediatric class are included in AN-SNAP V4.

The paediatric palliative care classes are defined firstly by phase splitting on 'terminal' or 'not terminal'. The 'not terminal' group then splits on age, with babies less than one year old grouped separately. Older patients are further split using palliative care phase into 'complex' (unstable or deteriorating phase) and stable. The result is four paediatric palliative care classes.

The paediatric rehabilitation classes are defined by impairment code ('brain dysfunction', 'neurological conditions', 'spinal cord dysfunction' and 'other') and age.

The paediatric rehabilitation classes are defined firstly by age with an age split of 0-3 years forming a single class. The older group is then split into four impairment groups - spinal cord dysfunction, brain dysfunction, neurological and other. A map between the AROC impairment codes and the four proposed paediatric groups has been developed to ensure that data can be collected consistently. This will need to be finalised in coming months and may be refined for future versions of AN-SNAP if required.

The single non-acute paediatric class is defined by age. This class sits logically within the adult non-acute branch of AN-SNAP. However, the paediatric palliative care and rehabilitation classes are distinct from the equivalent adult classes. For this reason, they have been located separately but following the respective adult classes. This means that, for rehabilitation and palliative care, the first split after setting (non-admitted vs admitted) is based on age (≤17 or >17) or a new variable, Age Type, which is discussed in Section 4.3.

3.5 AN-SNAP V4 same-day classes

In AN-SNAP V3, same-day admitted activity is classified in the ambulatory branch of the classification together with outpatient and community-based activity. In addition, activity is classified on an episode basis, where an episode typically comprises a series of same-day or outpatient events. The rationale for the current structure of AN-SNAP was previous findings that same-day subacute activity is clinically more similar to outpatient and community-based care than admitted subacute overnight care.

There were very few same-day records in the analysis datasets used in the development of AN-SNAP V4. Stakeholder feedback supported the retention of same-day classes in the ambulatory branches of AN-SNAP. At the same time, several stakeholders raised concerns around difficulties associated with assigning same-day subacute activity to AN-SNAP classes. Specifically, where same-day admitted activity occurs, it is usually recorded in admitted patient information systems with each same-day admission counted as an episode for ABF purposes. Moreover, very few services have implemented the ambulatory branches of AN-SNAP.

For this reason, an analysis of available data was undertaken to determine if same-day admitted subacute classes could be identified separately from the ambulatory branch of the classification. This analysis investigated the possibility of creating classes based on impairment for rehabilitation, and classes based on phase for palliative care. Same-day GEM data were also

analysed in an attempt to identify separate same-day classes. However, it was not possible to identify any same-day subacute classes based on these analyses.

Following further stakeholder consultation, a set of same-day admitted classes has been included in AN-SNAP V4 at the care type level. Specifically, one class is included for each for the adult palliative care, paediatric palliative care, adult rehabilitation, paediatric rehabilitation, psychogeriatric and GEM branches. For a same-day episode to be grouped to one of these same-day admitted classes, the admission would need to satisfy the care type definition including the requirement for multidisciplinary care to be provided.

The inclusion of same-day admitted classes does not address the issue of whether a sequence of same-day visits should be combined to create an episode of care. Certainly, a large proportion of subacute same-day and non-admitted activity is delivered as a program, with an expected number of treatment occasions. Further work will be required to address this issue. For example, business rules will be required to ensure that incentives are not created to classify episodes as either same-day admitted or non-admitted.

For paediatric care, numerous same-day admitted rehabilitation programs are equivalent to those provided in an admitted setting. On the other hand, some services provide same-day admitted care that is equivalent to the care provided by other services in a non-admitted setting. These differences will need to be reflected in business rules and funding models so that the equivalent type of care receives the same level of funding, regardless of the setting in which it is provided.

The six same-day admitted classes are shown in Table 17.

Table 17 AN-SNAP V4 same-day admitted classes

Episode	Age	Care Type	AN-SNAP Class
Same-day Admitted	Adult	Rehabilitation	4J01
Same-day Admitted	Adult	Palliative care	4K01
Same-day Admitted	Adult	GEM	4L01
Same-day Admitted	Adult	Psychogeriatric	4M01
Same-day Admitted	Paediatric	Rehabilitation	4O01
Same-day Admitted	Paediatric	Palliative care	4P01

3.6 The AN-SNAP V4 non-admitted classes

There are 35 non-admitted classes for palliative care, rehabilitation, psychogeriatric care and GEM. In addition there are six error classes. As outlined above, the data available for this project did not include the clinical variables required to test the ambulatory AN-SNAP V3 classes. As a result, the proposed AN-SNAP V4 non-admitted classes are based on clinical and other stakeholder advice obtained during the project. Notwithstanding these data limitations, a number of changes are proposed for the non-admitted branches of AN-SNAP.

There were mixed views on the issue of whether non-admitted subacute care should be classified on an episode or a service event basis. There is an emerging view that consideration

should be given for the unit of counting for non-admitted activity to be a combination of episode and service event. In particular, during the clinical consultations, there was broad agreement that multi-disciplinary non-admitted subacute care is well suited to being classified on an episode basis using AN-SNAP. In contrast, single discipline non-admitted care is more suited to being classified on a service event basis using a classification such as the Tier 2 Non-admitted Service Classification. AN-SNAP V3 ambulatory classes can be easily identified as either single discipline or multi-disciplinary. It is proposed, therefore, that the single discipline classes in the current version of AN-SNAP be removed from AN-SNAP V4.

The remaining multi-disciplinary classes were reviewed by each clinical committee. For the rehabilitation and GEM care types, it was agreed that the FIM™ is not an appropriate clinical tool in the non-admitted setting. Rather, it is proposed that the non-admitted classes for these care types are based on the relevant clinical program. As shown in Figure 10, seven program categories have been identified for rehabilitation and four for GEM. For palliative care, it is proposed that 'palliative care phase', 'palliative care problem severity score', and 'RUG-ADL' scores be used as splitting variables. The eight palliative care non-admitted classes are shown in Figure 13. The psychogeriatric ambulatory AN-SNAP V3 classes have not been revised. As noted above, all ambulatory maintenance (non-acute) classes in AN-SNAP V3 have been removed based on advice from the sector that this care is no longer provided.

The proposed non-admitted classes apply to all episodes/phases of non-admitted multidisciplinary care provided in an outpatient or a community setting. During the consultations, there was consistent agreement that the difference between the type of care provided in a same-day admitted setting is equivalent to that provided in a non-admitted setting and is driven primarily by differences in local admission policies.

More work is required to refine the non-admitted AN-SNAP V4 classes. This work will need to occur in the context of parallel classification developments being undertaken across the health system.

In relation to non-admitted paediatric care, it is proposed that the non-admitted classes in AN-SNAP V4 are the same as those in the admitted branch. Future versions of AN-SNAP may include different classes in the non-admitted branch, if subsequent collections of data show that to be appropriate.

Table 18 AN-SNAP V4 non-admitted classes

Non-admitted Adult Rehabilitation Classes

Code	Description
4SY1	Assessment only
4SA1	Stroke program
4SB1	Brain Dysfunction program
4SD1	Spinal Cord Dysfunction program
4SG1	Pain syndromes program
4S11	Orthopaedic conditions program
4SK1	Cardiac program

Code	Description
4S91	Other program
499S	Adult Non-admitted Rehabilitation - Ungroupable

Non-admitted Paediatric Rehabilitation Classes

Code	Description
4X01	Rehabilitation, Age ≤ 3
4X02	Rehabilitation, Age ≥ 4, Spinal cord dysfunction
4X03	Rehabilitation, Age ≥ 4, Brain dysfunction
4X04	Rehabilitation, Age ≥ 4, Neurological conditions
4X05	Rehabilitation, Age ≥ 4, All other impairments
499X	Paediatric Non-admitted Rehabilitation - Ungroupable

Non-admitted Adult Palliative Care Classes

Code	Description
4TS1	Stable phase, multidisciplinary
4TU1	Unstable phase, multidisciplinary, RUG-ADL 4, PCPSS 0-7
4TU2	Unstable phase, multidisciplinary, RUG-ADL 4, PCPSS 8-12
4TU3	Unstable phase, multidisciplinary, RUG-ADL 5-18
4TD1	Deteriorating phase, multidisciplinary, PCPSS 0-6
4TD2	Deteriorating phase, multidisciplinary, PCPSS 7-12, RUG-ADL 4-10
4TD3	Deteriorating phase, multidisciplinary, PCPSS 7-12, RUG-ADL 11-18
4TT1	Terminal phase, multidisciplinary
499T	Adult Non-admitted Palliative Care - Ungroupable

Non-admitted Paediatric Palliative Care Classes

Code	Description
4Y01	Palliative Care, Not Terminal phase, Age < 1 year
4Y02	Palliative Care, Stable phase, Age ≥ 1 year
4Y03	Palliative Care, Unstable or Deteriorating phase, Age ≥ 1 year
4Y04	Palliative Care, Terminal phase
499Y	Paediatric Non-admitted Palliative Care - Ungroupable

Non-admitted GEM Classes

Code	Description
4UC1	Single day of care without ongoing care plan
4UC2	Falls clinic
4UC3	Memory clinic
4UC4	Other clinic
499U	Non-admitted GEM - Ungroupable

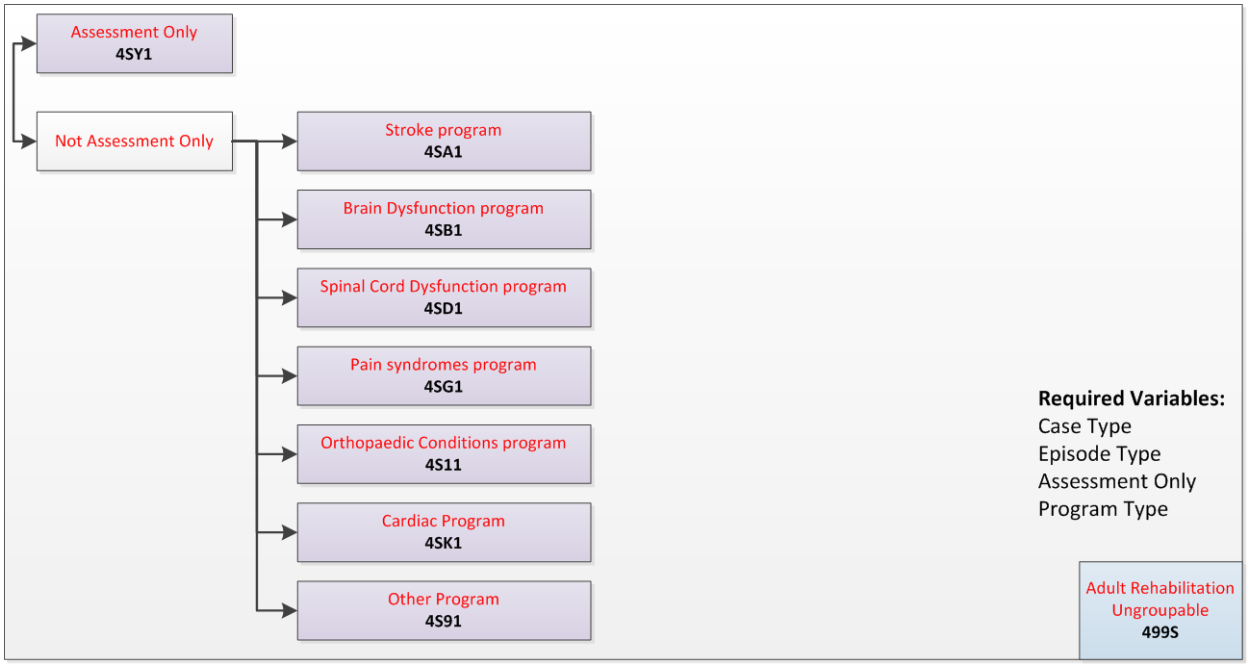
Non-admitted Psychogeriatric Classes

Code	Description
4VY1	Assessment only
4VA1	Treatment, Focus of Care acute
4VN1	Treatment, Focus of Care not acute, HoNOS 65+ total 0-8
4VN2	Treatment, Focus of Care not acute, HoNOS 65+ total 9-13
4VN3	Treatment, Focus of Care not acute, HoNOS 65+ total 14-48, HoNOS 65+ Overactive behaviour 0-1
4VN4	Treatment, Focus of Care not acute, HoNOS 65+ total 14-48, HoNOS 65+ Overactive behaviour 2-4
499V	Non-admitted Psychogeriatric Care - Ungroupable

3.6.1 Non-admitted adult rehabilitation classes

The adult non-admitted adult rehabilitation branch of AN-SNAP V4 comprises eight classes and was developed from AN-SNAP V3 based on clinical consultation. The algorithm for the non-admitted adult rehabilitation care classes is shown in Figure 10.

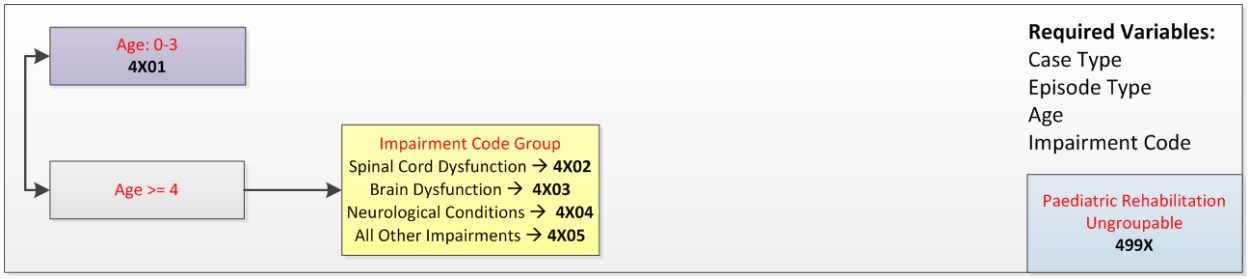
Figure 10 Non-admitted adult rehabilitation classes



3.6.2 Non-admitted paediatric Rehabilitation Classes

The non-admitted paediatric rehabilitation branch of AN-SNAP V4 comprises five classes and was developed based on clinical consultation. The algorithm for the non-admitted paediatric rehabilitation classes is shown in Figure 11.

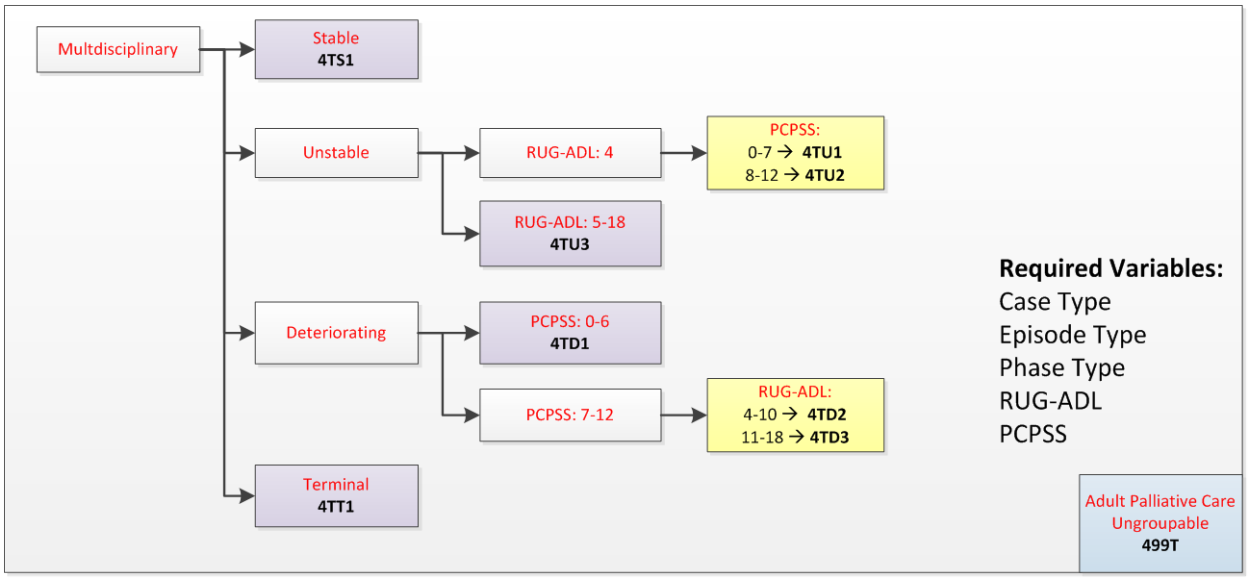
Figure 11 Non-admitted paediatric rehabilitation classes



3.6.3 Non-admitted adult palliative care classes

The non-admitted adult palliative care branch of AN-SNAP V4 comprises eight classes and was developed from AN-SNAP V3 based on clinical consultation. The algorithm for the non-admitted adult palliative care classes is shown in Figure 12.

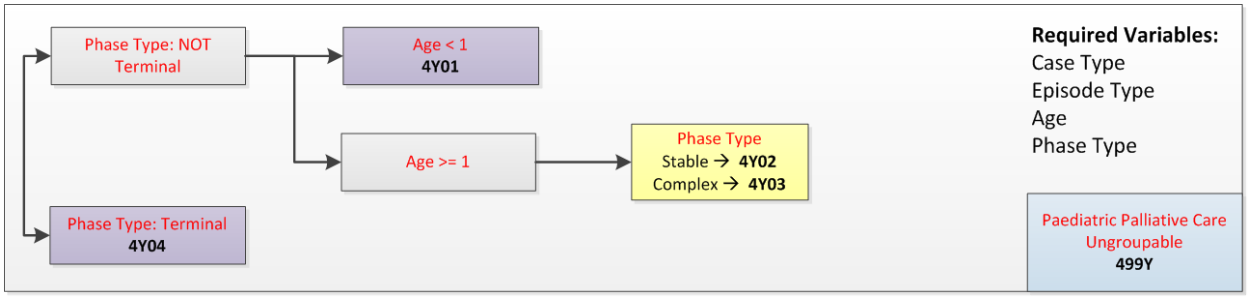
Figure 12 Non-admitted adult palliative care classes



3.6.4 Non-admitted paediatric palliative care classes

The paediatric non-admitted paediatric palliative care branch of AN-SNAP V4 comprises four classes and was developed based on clinical consultation. The algorithm for the non-admitted paediatric palliative care classes is shown in Figure 13.

Figure 13 Non-admitted paediatric palliative care classes



3.6.5 Non-admitted GEM classes

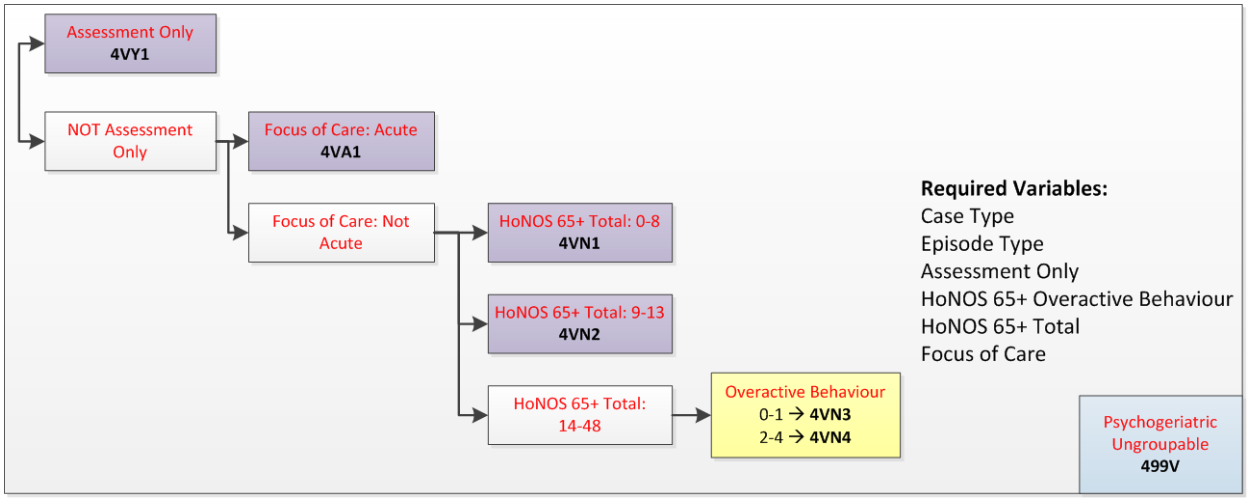
The non-admitted GEM branch of AN-SNAP V4 comprises four classes and was developed from AN-SNAP V3 based on clinical consultation. The algorithm for the non-admitted GEM classes is shown in Figure 14.

Figure 14 Non-admitted GEM classes

3.6.6 Non-admitted psychogeriatric classes

The non-admitted psychogeriatric branch of AN-SNAP V4 comprises six classes and was developed from AN-SNAP V3 based on clinical consultation. The algorithm for the non-admitted psychogeriatric care classes is shown in Figure 15.

Figure 15 Non-admitted psychogeriatric classes



4 DISCUSSION

This project has produced a revised version of the AN-SNAP classification that is suitable for both classification and funding purposes. The changes incorporated in AN-SNAP V4 can be characterised as modest. Overall, the admitted AN-SNAP V4 classes represent an important improvement on the current version of the classification both in terms of its statistical performance and the extent to which it reflects current clinical practice. The non-admitted AN-SNAP V4 classes represent an initial effort to improve the classification's potential to be suitable for implementation across the subacute sector.

During the development of AN-SNAP V4, a wide range of clinical, statistical and practical issues were explored. A large number of the issues considered were in response to suggestions provided by stakeholders. In some cases, issues were raised that were outside the scope of the project. In other cases, it was not possible to consider particular suggestions in detail simply because the required data were not available. Overall, all issues were considered carefully whilst applying a set of recognised classification development principles to produce a set of classes that best addresses the project's objectives.

The key issues that have arisen during the project and the implications for the ongoing implementation of the classification are discussed below. Priority areas for further development work are also highlighted.

4.1 The structure of the AN-SNAP classification

The underlying structure of the classification has not changed in terms of comprising separate care types for palliative care, rehabilitation, psychogeriatric care, GEM and non-acute care. The only structural changes involve renaming the two major branches of AN-SNAP V4 from 'overnight' and 'ambulatory' to 'admitted' and 'non-admitted' and re-ordering of the care type sub-branches to be consistent with national definitions. In addition, paediatric AN-SNAP classes have been included for the first time and the non-admitted and same-day admitted non-acute classes have been removed from the classification.

Each of the clinical committees recognised that the clinical profile of subacute patients has changed considerably in recent years with patients now often admitted more acutely unwell and with a broad range of comorbidities and/or behavioural issues. One of the limitations of this study was the lack of data available to assess options for making major structural changes to the classification.

It was not possible, for example, to model different scenarios under which the admitted rehabilitation, GEM and psychogeriatric care types are combined. One possibility (identified by several clinical committees) was to reduce the number of care types from five to four (palliative care, rehabilitation, aged mental health and non-acute care). Under this scenario, the aged mental health care type would, in effect, be an amalgamation of the current GEM and psychogeriatric branches. Patients currently classified under the psychogeriatric care type would be assigned to this branch. Patients currently classified under the GEM care type would be assigned to the aged mental health branch if they have significant cognitive, behavioural or

mental health problems or to either the rehabilitation or non-acute branch if they do not have significant cognitive, behavioural or mental health problems.

The same discussions occurred in relation to the non-admitted branches of AN-SNAP. However, there was a general consensus that there would be less capacity to combine care types in this way in non-admitted settings.

4.2 Implications for each subacute and non-acute care type

An assessment of the major implications of adopting the recommended AN-SNAP V4 classes for each care type has been undertaken. The issues and findings are presented below.

4.2.1 Implications for the rehabilitation care type

A modest set of changes has been incorporated into the admitted rehabilitation classes. As discussed earlier, weighted FIM™ motor scores have been introduced for the majority of impairment groups. This refinement to the application of the FIM™ was supported by the clinical committee on the basis that it is clinically intuitive and improves the performance of the classification. Whilst the use of a weighted FIM™ motor score may seem like a complex change, it should be noted that it will have no impact on the clinical application of the tool.

The changes to the rehabilitation branch ensure that the AN-SNAP V4 classes reflect current clinical practice without imposing any additional data collection burden on services.

4.2.2 Implications for the palliative care type

The changes to this care type are relatively modest. It is recognised that removal of the bereavement phase as a separate AN-SNAP class could be interpreted as a signal that bereavement services will not be recognised. In fact, the clinical committee strongly agreed that bereavement support services must continue to be recognised as representing a core function of both admitted and community based palliative care services. As noted earlier, in their view, the most effective way for this to occur is for bereavement services to be addressed through payment models rather than the classification. For this to occur, it will be important for agency-level funding arrangements to be based on agreed policies, protocols and procedures.

4.2.3 Implications for the GEM care type

The inclusion of the GEM care type in the AN-SNAP V1 occurred because the profile of the data analysed in that study indicated that GEM episodes were sufficiently different to both rehabilitation and maintenance (non-acute) episodes to form a separate care type[11]. In that study, the FIM™ cognition sub-scale proved to be a good predictor of costs and was included in the classification on that basis.

[11] Eagar et al (1997). The Australian national Sub-acute and Non-acute Patient Classification (AN-SNAP): report of the National Sub-acute and Non-acute Casemix Classification Study. Centre for Health Service Development, University of Wollongong.

One of the objectives of this project was to identify any changes in cost drivers in the GEM care type and to assess the utility of agreed clinical tools in predicting differences in cost. A particular concern identified related to the use of the FIM™ cognition sub-scale within this branch of AN-SNAP.

In AN-SNAP V4, the FIM™ cognition sub-scale has been removed from the GEM care type. As noted, this decision was based on ongoing concerns expressed about its inclusion in future versions of AN-SNAP rather than an analysis of its statistical performance. No data were available to allow the assessment of alternative clinical tools to occur.

This may occur in the future and allow the identification of more sensitive measures to be incorporated into subsequent versions of AN-SNAP. Consultations show there are often significant overlaps between rehabilitation and GEM patients both in terms of the ward on which they are treated and the team of treating providers. As a result, there are potential risks of creating perverse incentives if different instruments are used to classify patients with the same underlying dimensions.

A more sustainable long term solution would be to investigate the options for a major restructure of the classification as discussed in Section 4.1 above.

4.2.4 Implications for the psychogeriatric care type

As noted, it was agreed at an early stage of the project that the review of the psychogeriatric care type would be limited. As a result, the only change to this care type has been the removal of the assessment only class.

Given the limited work on this care type that was able to be completed in the development of AN-SNAP V4, a separate paper was developed to clearly outline possible options for the future classification of subacute psychogeriatric care. This paper was developed initially for consideration by the psychogeriatric clinical committee and is provided at Appendix 8.

4.2.5 Implications for the non-acute care type

The data analysis confirmed that the cost of non-acute patients is significantly higher than nursing home payment rates and in numerous instances is no less expensive than the subacute care types. RUG-ADL continued to be predictive of cost and has been retained as a splitting variable.

Some feedback suggested that the long term care class should be removed because LOS is not a clinical variable and payment models include mechanisms for appropriate funding of outlier episodes. After consideration, the long term care class in this care type has been retained based on statistical analysis and clinical advice and recognising that casemix classifications are used for a range of purposes. Improvements in the data collection processes associated with this care type may enable the inclusion of other variables to define these long term patients in the future.

This class could be bypassed in a funding model. That is, a payment model could be designed that assigns it a cost weight of 0 and these episodes could be funded as outliers in the remaining non-acute classes.

4.3 The introduction of paediatric classes

The development of paediatric classes for AN-SNAP V4 was an important objective of this project and is an important milestone in the evolution of the classification. At the same time, it is important to recognise that the proposed classes are very much a 'first version' and will need to be refined over time as additional data become available. The importance of implementing a nationally consistent paediatric subacute data collection to support such refinements will be critical if this is to occur.

CHSD would propose a two-stage approach to better define the paediatric palliative care classes. Firstly, for AN-SNAP V4 classes, the paediatric palliative care clinicians identified the important groups as 'stable', 'complex' and 'terminal'. In the list of classes, these groups have been labelled as 'stable', 'unstable or deteriorating' and 'terminal' because, for now, these will be defined by the palliative care phase tool. The advantage of this is that the palliative care sector is familiar with this tool and its associated definitions. Development of a new tool to define these groups would be a lengthy process and would delay the inclusion of paediatric classes in AN-SNAP.

As a second stage, the definition of 'complex' could be clarified in this context. Potentially this would also require the definitions of 'stable' and 'terminal' to be reconsidered in the paediatric context. This may lead to the development of a new tool suitable for paediatrics which would have to be agreed and piloted. Relevant data would need to be collected before it could be included in AN-SNAP.

The definition may result in a category that is also helpful for classifying paediatric non-acute patients. Some related definitions have been identified from the UK group – Together for Short Lives – and from those used at Zoe's Place, a respite facility/hospice previously operated by Queensland Health. The body of work to clarify these definitions should also include an international literature search for other related options.

For the paediatric rehabilitation classes, the specific inclusions in each of the impairment clusters need to be finalised. This could involve the future development of a new tool. For non-admitted care, it was noted that contacts with patients could be broadly categorised as assessment, therapeutic interventions or procedural interventions. Perhaps this grouping could inform future versions of the non-admitted classes for paediatric rehabilitation.

Finally, although there is not a strict age requirement for a patient to come under the care of paediatric services, a decision does need to be made as to the relevant age group for the paediatric classes. Different clinical tools are required for a patient to be classified in the adult classes. The appropriate class for an episode of care is based on characteristics of the patient rather than the service that is providing the care. If a service is providing services to patients

who are within both the agreed paediatric and adult age ranges, then the full range of clinical tools and data collection processes will need to be available for assessing the patients.

Although there is not a single age that is used uniformly across Australia to decide whether a patient should be treated by a specialist paediatric service, the AN-SNAP V4 grouping algorithm requires a specific value to decide between the adult or paediatric classes. It is proposed that patients who are 17 years old or less will group to a paediatric class.

To accommodate circumstances in which services would prefer all their patients to group to the same subset of classes (paediatric or adult), a new variable, Age Type, is proposed. This variable can override the patient's age in a limited set of circumstances. For example, a rehabilitation patient who is 16 or 17 may be treated in an adult unit. For internal management purposes, it may be more convenient to group all patients in the unit to the adult classes. Alternatively, a paediatric unit may want to classify their 18- or 19-year old patients with the paediatric classes. To implement such a system would require a set of clearly defined business rules.

4.4 The treatment of consultation/liaison services in AN-SNAP

The issue of consultation/liaison services was raised consistently by stakeholders during the project. It is widely recognised that an increasing proportion of subacute care is undertaken on a consultation/liaison basis. These services are provided by subacute rehabilitation, palliative care and GEM services under various models of care that differ within and between jurisdictions. In addition, the majority of subacute paediatric services are provided on this basis. Consultation/liaison services are not captured in the current AN-SNAP classification.

Both clinical and jurisdictional stakeholders have been consulted in relation to this issue at different stages during the project. There is a strong view that this model of care needs to be recognised and appropriate data collection processes established to support both classification and funding applications. Some jurisdictions have data collections in place for specialist consultation/liaison services. Others are keen to see data developments to support a more accurate and meaningful measure of this model of care as its prevalence increases.

No comprehensive data on consultation/liaison services were available for analysis during this project. As such, it has not been possible to incorporate these services into the AN-SNAP V4 classes. It was suggested that consultation/liaison activity could be effectively incorporated into the non-admitted branches of AN-SNAP and funded on this basis. However, this would require the availability of data and further consultation processes that were not possible in the current project.

Regardless of the policy decisions made in relation to the treatment of consultation/liaison services, there is a compelling argument to develop a nationally consistent approach to the classification of this growing area of activity in the subacute sector.

4.5 Implementation issues associated with AN-SNAP V4

This project has developed a revised version of the AN-SNAP classification. Implementation of any casemix classification, particularly one that will underpin a funding model, requires that the

variables required to assign an episode to a class are collected on a routine basis. When AN-SNAP was introduced by IHPA in 2012/13 as the national subacute classification for ABF purposes, an admitted dataset specification was developed to support the collection of subacute and non-acute data on public and private patients in public hospital services.

Jurisdictions have been working since that time to implement the routine collection of the Admitted Subacute and Non-Acute Hospital Care Data Set Specification (DSS). A range of data issues have emerged that are being addressed by IHPA through mechanisms such as the Subacute Care Working Group (SCWG) and the National Health Information Standards and Statistics Committee (NHISSC). The introduction of a new version of a classification system, particularly if new data items are introduced, has the potential to require additional resources to be invested on implementation such as on information systems and education and training.

4.5.1 Implications for routine data collections

The implementation of AN-SNAP V4 should not have any significant implications on existing routine data collections. AN-SNAP V4 introduces the use of ICD-10-AM codes for 'dementia' and 'delirium' diagnoses in the GEM care type. Whilst ICD-10-AM codes are routinely collected on all admitted episodes, there will need to be some discussion about the best way for this information to be collected in the subacute context.

From a costing perspective, the data provided for analysis in this project suggest that there is considerable variability in the quality of subacute care data collected through the NHCDC process. Several jurisdictions confirmed that NHCDC subacute care costing is still new and does not have the level of sophistication that exists in acute care costing processes. A particular issue relates to the routine costing of palliative care phases which is not consistently undertaken in some jurisdictions.

The cost data provided for this project has allowed a modest set of refinements to be made to AN-SNAP. However, if a more substantial review of the classification is undertaken in the future, it would require the development and implementation of a robust costing methodology.

CHSD are not aware of any other specific issues likely to arise as a result of the implementation of AN-SNAP V4 that are not being addressed through the current implementation of AN-SNAP V3.

4.6 Options for the ongoing development of the AN-SNAP classification

Numerous issues have emerged during the project that highlight the importance of investing in the future development of the AN-SNAP classification. This project has been constrained, to a large extent, by the lack of data with which to test potential refinements. This issue was identified at the commencement of the project as a potential risk which was realised as the project evolved. Nevertheless, the relatively modest set of changes in this new version better reflects current clinical practices in the subacute and non-acute sectors and represents an improvement to the performance of the classification.

The results obtained in the development of AN-SNAP V4 suggest that the focus of future development work should include:

- Giving careful consideration to the overlap between the GEM, rehabilitation and psychogeriatric care types and the series of projects being commissioned by IHPA to develop a new mental health care classification. This project has highlighted that clinicians are reporting that the GEM patient population now includes an increasingly large percentage of patients with a range of cognitive impairments and behavioural issues. If this is the case, the psychogeriatric care type can be regarded as now sitting somewhere in between the mental health and GEM care types.
- Additional work to refine the paediatric classes developed during this project. This will require the development and implementation of a consistent paediatric dataset that can be collected by paediatric subacute services to provide the required data for this to occur.
- Work to refine the AN-SNAP V4 non-admitted classes, including the development of relative cost weights for each class. This work will need to be undertaken in conjunction with developments currently occurring in the non-admitted sector.
- Investigating the inclusion of a clinical tool in the GEM branch of future versions of AN-SNAP. It has been suggested that the variable 'behaviour' is increasingly having an impact on the cost of care of GEM patients.

5 Recommendations

The following recommendations relate to the proposed AN-SNAP V4 classification as outlined in this report.

Overall, it is recommended that:

1. The proposed AN-SNAP V4, be adopted as the Australian national standard classification for subacute and non-acute care:
    a. That the variables included in AN-SNAP V4 be collected on a routine basis for subacute and non-acute episodes; and
    b. That AN-SNAP V4 be adopted as the classification for national Activity Based Funding of subacute and non-acute services.

Specifically, it is recommended that:

2. The description of the two major branches of AN-SNAP V4 be amended from 'overnight admitted' and 'ambulatory' to 'admitted' and 'non-admitted';
3. The order in which the care type sub-branches are listed within the admitted and non-admitted branches of the classification is changed to be consistent with national definitions;
4. Four character alpha numeric codes be introduced for AN-SNAP V4 classes;
5. Paediatric classes for the palliative care, rehabilitation and non-acute care types be introduced in AN-SNAP V4;
6. Six same-day admitted classes (one for each of rehabilitation, palliative care, psychogeriatrics, GEM, paediatric rehabilitation and paediatric palliative care) be introduced in the admitted branches of AN-SNAP V4;
7. 'Assessment only' classes be removed from AN-SNAP V4;
8. The bereavement classes be removed from the admitted and non-admitted palliative care branches of AN-SNAP V4;
9. Minor refinement be made to the positioning of age and clinical splits in the admitted branches of AN-SNAP V4;
10. Diagnoses of dementia and delirium be introduced as splitting variables in the admitted GEM AN-SNAP V4 classes;
11. The non-admitted non-acute (previously named ambulatory maintenance) classes be removed from AN-SNAP V4;
12. The FIM™ cognitive sub-scale be removed from the GEM care type and both FIM™ sub-scales be removed from the non-admitted branches of AN-SNAP V4; and
13. Single discipline classes be removed from the non-admitted branches of AN-SNAP V4.

The following recommendations relate to the ongoing development of the AN-SNAP classification.

It is recommended that:

14. A national paediatric subacute dataset be developed and be routinely collected by all paediatric subacute services. Supplementary data analysis should subsequently be

conducted using a consolidated paediatric dataset to develop cost weights for the recommended AN-SNAP paediatric classes and allow further refinement of the classes.

15. That developmental work be undertaken to improve the counting, classification, costing and funding of consultation/liaison services provided in the subacute sector. Based on stakeholder feedback, it is important for this work to occur regardless of the funding models implemented for consultation/liaison services.
16. That further work is undertaken on the development of the admitted branches of AN-SNAP:
    a. Further work is required to better understand the relationship between the rehabilitation, GEM and psychogeriatric care types;
    b. Further work should be commissioned to identify appropriate clinical tools for incorporation into the classification; and
    c. Further consultation should occur between the aged care and mental health sectors to develop an agreed position on the future of the psychogeriatric care type.
17. That further work be undertaken on the developmental of the non-admitted branches of AN-SNAP:
    a. Further care type specific work is required to better understand the type of multidisciplinary subacute care services provided in non-admitted settings. This work should lead to the refinement of the AN-SNAP V4 non-admitted classes and allow the development of associated measure of resource utilisation;
    b. Further work is required to develop business rules around the counting and classification of non-admitted AN-SNAP services. This work should include the development of definitions and business rules for all variables and related concepts to allow episodes of care to be assigned to AN-SNAP classes.
18. That jurisdictions continue to refine the subacute NHCDC processes to improve the capacity of subacute care services to generate accurate cost data by AN-SNAP class.

Appendix 1 The AN-SNAP V3 Classification

Class	Episode Type	Description
3-101	Overnight Palliative Care	Palliative care, admit for assessment only
3-102	Overnight Palliative Care	Stable phase, RUG-ADL 4
3-103	Overnight Palliative Care	Stable phase, RUG-ADL 5-17
3-104	Overnight Palliative Care	Stable phase, RUG-ADL 18
3-105	Overnight Palliative Care	Unstable phase, RUG-ADL 4-17
3-106	Overnight Palliative Care	Unstable phase, RUG-ADL 18
3-107	Overnight Palliative Care	Deteriorating phase, RUG-ADL 4-14
3-108	Overnight Palliative Care	Deteriorating phase, RUG-ADL 15-18, age <=52
3-109	Overnight Palliative Care	Deteriorating phase, RUG-ADL 15-18, age >=53
3-110	Overnight Palliative Care	Terminal phase, RUG-ADL 4-16
3-111	Overnight Palliative Care	Terminal phase, RUG-ADL 17-18
3-112	Overnight Palliative Care	Bereavement phase
3-151	All ambulatory Palliative Care	Medical only
3-152	All ambulatory Palliative Care	Therapies only
3-153	All ambulatory Palliative Care	Stable phase, multidisciplinary
3-154	All ambulatory Palliative Care	Stable phase, nursing only, Palliative Care Problem Severity Score (PCPSS) <=6, RUG-ADL 4, age>=67
3-155	All ambulatory Palliative Care	Stable phase, nursing only, PCPSS <=6, RUG-ADL 4, age<=66
3-156	All ambulatory Palliative Care	Stable phase, nursing only, PCPSS <=6, RUG-ADL 5-18
3-157	All ambulatory Palliative Care	Stable phase, nursing only, PCPSS >=7
3-158	All ambulatory Palliative Care	Unstable phase, multidisciplinary, RUG-ADL 4, PCPSS <=7
3-159	All ambulatory Palliative Care	Unstable phase, multidisciplinary, RUG-ADL 4, PCPSS >=8
3-160	All ambulatory Palliative Care	Unstable phase, multidisciplinary, RUG-ADL 5-18
3-161	All ambulatory Palliative Care	Unstable phase, nursing only, RUG-ADL <=14, age>=60
3-162	All ambulatory Palliative Care	Unstable phase, nursing only, RUG-ADL <=14, age<=59
3-163	All ambulatory Palliative Care	Unstable phase, nursing only, RUG-ADL >=15
3-164	All ambulatory Palliative Care	Deteriorating phase, multidisciplinary, PCPSS <=6
3-165	All ambulatory Palliative Care	Deteriorating phase, multidisciplinary, PCPSS >=7, RUG<=10
3-166	All ambulatory Palliative Care	Deteriorating phase, multidisciplinary, PCPSS >=7, RUG>=11
3-167	All ambulatory Palliative Care	Deteriorating phase, nursing only, RUG-ADL 4
3-168	All ambulatory Palliative Care	Deteriorating phase, nursing only, RUG-ADL 5-18
3-169	All ambulatory Palliative Care	Terminal phase, multidisciplinary
3-170	All ambulatory Palliative Care	Terminal phase, nursing only
3-171	All ambulatory Palliative Care	Bereavement phase, age >=45
3-172	All ambulatory Palliative Care	Bereavement phase, age <=44
3-201	Overnight Rehabilitation	Rehabilitation, admit for assessment only
3-202	Overnight Rehabilitation	Brain, Neurological, Spinal & Major Multiple Trauma, FIM motor 13
3-203	Overnight Rehabilitation	All other impairments, FIM motor 13
3-204	Overnight Rehabilitation	Stroke, FIM motor 63-91, FIM cognition 20-35
3-205	Overnight Rehabilitation	Stroke, FIM motor 63-91, FIM cognition 5-19

Class	Episode Type	Description
3-206	Overnight Rehabilitation	Stroke, FIM motor 47-62, FIM cognition 16-35
3-207	Overnight Rehabilitation	Stroke, FIM motor 47-62, FIM cognition 5-15
3-208	Overnight Rehabilitation	Stroke, FIM motor 14-46, age>=75
3-209	Overnight Rehabilitation	Stroke, FIM motor 14-46, age<=74
3-210	Overnight Rehabilitation	Brain Dysfunction, FIM motor 56-91, FIM cognition 32-35
3-211	Overnight Rehabilitation	Brain Dysfunction, FIM motor 56-91, FIM cognition 24-31
3-212	Overnight Rehabilitation	Brain Dysfunction, FIM motor 56-91, FIM cognition 20-23
3-213	Overnight Rehabilitation	Brain Dysfunction, FIM motor 56-91, FIM cognition 5-19
3-214	Overnight Rehabilitation	Brain Dysfunction, FIM motor 24-55
3-215	Overnight Rehabilitation	Brain Dysfunction, FIM motor 14-23
3-216	Overnight Rehabilitation	Neurological, FIM motor 63-91
3-217	Overnight Rehabilitation	Neurological, FIM motor 49-62
3-218	Overnight Rehabilitation	Neurological, FIM motor 18-48
3-219	Overnight Rehabilitation	Neurological, FIM motor 14-17
3-220	Overnight Rehabilitation	Spinal Cord Dysfunction, FIM motor 81-91
3-221	Overnight Rehabilitation	Spinal Cord Dysfunction, FIM motor 47-80
3-222	Overnight Rehabilitation	Spinal Cord Dysfunction, FIM motor 14-46, age>=33
3-223	Overnight Rehabilitation	Spinal Cord Dysfunction, FIM motor 14-46, age<=32
3-224	Overnight Rehabilitation	Amputation of limb, FIM motor 72-91
3-225	Overnight Rehabilitation	Amputation of limb, FIM motor 14-71
3-226	Overnight Rehabilitation	Pain Syndromes
3-227	Overnight Rehabilitation	Orthopaedic conditions, fractures, FIM motor 58-91
3-228	Overnight Rehabilitation	Orthopaedic conditions, fractures, FIM motor 48-57
3-229	Overnight Rehabilitation	Orthopaedic conditions, fractures, FIM motor 14-47, FIM cognition 19-35
3-230	Overnight Rehabilitation	Orthopaedic conditions, fractures, FIM motor 14-47, FIM cognition 5-18
3-231	Overnight Rehabilitation	Orthopaedic conditions, replacement, FIM motor 72-91
3-232	Overnight Rehabilitation	Orthopaedic conditions, replacement, FIM motor 49-71
3-233	Overnight Rehabilitation	Orthopaedic conditions, replacement, FIM motor 14-48
3-234	Overnight Rehabilitation	Orthopaedic conditions, all other, FIM motor 68-91
3-235	Overnight Rehabilitation	Orthopaedic conditions, all other, FIM motor 53-67
3-236	Overnight Rehabilitation	Orthopaedic conditions, all other, FIM motor 14-52
3-237	Overnight Rehabilitation	Cardiac
3-238	Overnight Rehabilitation	Major Multiple Trauma, FIM total 101-126
3-239	Overnight Rehabilitation	Major Multiple Trauma, FIM total 74-100 or Burns
3-240	Overnight Rehabilitation	Major Multiple Trauma, FIM total 44-73
3-241	Overnight Rehabilitation	Major Multiple Trauma, FIM total 19-43
3-242	Overnight Rehabilitation	All other impairments, FIM motor 67-91
3-243	Overnight Rehabilitation	All other impairments, FIM motor 53-66
3-244	Overnight Rehabilitation	All other impairments, FIM motor 25-52
3-245	Overnight Rehabilitation	All other impairments, FIM motor 14-24
3-251	Same-day Rehabilitation	Brain, Major Multiple Trauma & Pulmonary
3-252	Same-day Rehabilitation	Burns, Cardiac, Pain, Spine, & Neurological

Class	Episode Type	Description
3-253	Same-day Rehabilitation	All other impairments
3-254	Outpatient & Community Rehabilitation	Outpatient and community rehabilitation, medical assessment only
3-255	Outpatient & Community Rehabilitation	Outpatient and community rehabilitation, multidisciplinary assessment
3-256	Outpatient & Community Rehabilitation	Outpatient and community rehabilitation, medical treatment only
3-257	Outpatient & Community Rehabilitation	Amputation
3-258	Outpatient & Community Rehabilitation	Brain Injury and Major Multiple Trauma
3-259	Outpatient & Community Rehabilitation	Spinal Injury
3-260	Outpatient & Community Rehabilitation	Stroke and Development Disability, sole practitioner
3-261	Outpatient & Community Rehabilitation	Stroke and Development Disability, multidisciplinary, FIM motor <=80
3-262	Outpatient & Community Rehabilitation	Stroke and Development Disability, multidisciplinary, FIM motor >=81
3-263	Outpatient & Community Rehabilitation	All other impairments, sole practitioner
3-264	Outpatient & Community Rehabilitation	All other impairments, multidisciplinary, FIM motor <=80
3-265	Outpatient & Community Rehabilitation	All other impairments, multidisciplinary, FIM motor >=81
3-301	Overnight Psychogeriatric	Psychogeriatric, admit for assessment only
3-302	Overnight Psychogeriatric	HoNOS 65+ Overactive behaviour 3,4
3-303	Overnight Psychogeriatric	HoNOS 65+ Overactive behaviour 1,2 HoNOS 65+ ADL 4
3-304	Overnight Psychogeriatric	HoNOS 65+ Overactive behaviour 1,2 HoNOS 65+ ADL 0-3
3-305	Overnight Psychogeriatric	HoNOS 65+ Overactive behaviour 0 HoNOS 65+ total>=18
3-306	Overnight Psychogeriatric	HoNOS 65+ Overactive behaviour 0 HoNOS 65+ total<=17
3-307	Overnight Psychogeriatric	Long term care
3-351	Outpatient Psychogeriatric	Outpatient psychogeriatric assessment only
3-352	Community Psychogeriatric	Assessment Only
3-353	All ambulatory Psychogeriatric	Treatment, Focus of Care=acute
3-354	All ambulatory Psychogeriatric	Treatment, Focus of Care=not acute, HoNOS 65+ total <=8
3-355	All ambulatory Psychogeriatric	Treatment, Focus of Care=not acute, HoNOS 65+ total 9-13
3-356	All ambulatory Psychogeriatric	Treatment, Focus of Care=not acute, HoNOS 65+ total >=14, HoNOS 65+ Overactive 0,1
3-357	All ambulatory Psychogeriatric	Treatment, Focus of Care=not acute, HoNOS 65+ total >=14, HoNOS 65+ Overactive 2,3,4
3-401	Overnight GEM	GEM admit for assessment only
3-402	Overnight GEM	FIM cognition <=15, FIM motor 13-43
3-403	Overnight GEM	FIM cognition <=15, FIM motor 44-91, age>=84
3-404	Overnight GEM	FIM cognition <=15, FIM motor 44-91, age<=83
3-405	Overnight GEM	FIM cognition 16-35, FIM motor 13-50
3-406	Overnight GEM	FIM cognition 16-35, FIM motor 51-77
3-407	Overnight GEM	FIM cognition 16-35, FIM motor 78-91
3-451	Same-day GEM	Same-day GEM, assessment Only
3-452	Outpatients & Community GEM	Outpatient and community GEM, medical assessment only
3-453	Outpatients & Community GEM	Outpatient and community GEM, multidisciplinary assessment
3-454	Same-day GEM	All same-day admitted GEM
3-455	Outpatients & Community GEM	FIM motor <=40
3-456	Outpatients & Community GEM	FIM motor 41-56

Class	Episode Type	Description
3-457	Outpatients & Community GEM	FIM motor>=57, sole practitioner
3-458	Outpatients & Community GEM	FIM motor>=57, multidisciplinary
3-501	Overnight Maintenance	Respite, RUG-ADL 15-18
3-502	Overnight Maintenance	Respite, RUG-ADL 5-14
3-503	Overnight Maintenance	Respite, RUG-ADL 4
3-504	Overnight Maintenance	Nursing Home Type, RUG-ADL 11-18
3-505	Overnight Maintenance	Nursing Home Type, RUG-ADL 4-10
3-506	Overnight Maintenance	Convalescent care
3-507	Overnight Maintenance	Other maintenance, RUG-ADL 14-18
3-508	Overnight Maintenance	Other maintenance, RUG-ADL 4-13
3-509	Overnight Maintenance	Long term care, RUG-ADL 17-18
3-510	Overnight Maintenance	Long term care, RUG-ADL 10-16
3-511	Overnight Maintenance	Long term care, RUG-ADL 4-9
3-551	All ambulatory Maintenance	Medical only
3-552	All ambulatory Maintenance	Ambulatory maintenance, nursing assessment only
3-553	All ambulatory Maintenance	Ambulatory maintenance, psychosocial assessment
3-554	All ambulatory Maintenance	Ambulatory maintenance, physical therapy assessment
3-555	Same-day & Community Maintenance	Same-day and community maintenance, multidisciplinary
3-556	Outpatient Maintenance	Outpatient maintenance, multidisciplinary assessment
3-557	All ambulatory Maintenance	Maintenance and support, nursing, age>=37, RUG-ADL>=5
3-558	All ambulatory Maintenance	Maintenance and support, nursing, age>=37, RUG-ADL 4
3-559	All ambulatory Maintenance	Maintenance and support, nursing, age<=36, RUG-ADL>=5
3-560	All ambulatory Maintenance	Maintenance and support, nursing, age<=36, RUG-ADL 4
3-561	All ambulatory Maintenance	Maintenance and support, physical therapy, RUG-ADL>=6
3-562	All ambulatory Maintenance	Maintenance and support, physical therapy, RUG-ADL 4,5
3-563	Community Maintenance	Community maintenance and support, multidisc, age>=27, RUG-ADL 4-11
3-564	All ambulatory Maintenance	Maintenance and support, multidisciplinary, age>=27, RUG-ADL>=12
3-565	Outpatient Maintenance	Outpatient maintenance and support, multidisc, age>=27, RUG-ADL 4-11
3-566	All ambulatory Maintenance	Maintenance and support, multidisciplinary, <=26 yrs
3-901	Overnight Palliative Care ungroupable	Data error - ungroupable
3-902	Overnight Rehabilitation ungroupable	Data error - ungroupable
3-903	Overnight GEM ungroupable	Data error - ungroupable
3-904	Overnight Psychogeriatric ungroupable	Data error - ungroupable
3-905	Overnight Maintenance ungroupable	Data error - ungroupable
3-906	All other subacute care ungroupable	Data error - ungroupable

Appendix 2 Key findings from the targeted literature review

The key findings from the targeted literature review are summarised below:

- Classifications for rehabilitation episodes have been developed in a number of countries, including Canada, the United States, England, France and the Nordic countries. Each incorporates a similar set of variables reflecting diagnosis, functional status (both motor and, for some impairments, cognitive), age and, in some cases, surgical procedures and co-morbidities;
- There are fewer reports of developments in classification systems specifically designed for the other subacute care types. A classification for palliative care is proposed in England. It is based on phase, provider type (specialist or non-specialist), problem severity, functional status and age. Some countries use classifications such as RUG III or RUG IV (which are based on therapy time, type of therapy, medical conditions and ADL score) for GEM and/or maintenance (non-acute) patients;
- In Canada, psychogeriatric episodes are grouped using the System for Classification of Inpatient Psychiatry (SCIPP), based on diagnosis and phase as well as assessment scores on cognition, behaviour, ADL and IADL;
- The Case Mix Groups classification in the United States uses weighted total of FIM™ motor item scores.
- Outside Australia, there are very few patient classifications designed specifically for non-admitted subacute services. The unit of counting and funding varies from country to country where funding may be based on fee for service, per visit, per day or per episode;

As part of the literature review, findings from projects commissioned by IHPA in recent years were reviewed. The key findings from this review most relevant to the development of AN-SNAP V4 were:

- A review of subacute cost drivers suggested that the RIV of AN-SNAP could be improved by adding cost drivers, adding more classes or by improving the measurement of functional status. It also recommended that an appropriate measure of comorbidities be included in the development of AN-SNAP V4;
- Based on analysis of a Victorian dataset, the above review found that service utilisation in subacute ambulatory (non-admitted) settings increases with age;
- A review of the National Outcomes and Casemix Collection found that there was general support for measures in use for classifying psychogeriatric care, particularly for the clinician-rated HoNOS family of measures (HoNOS 65+ for older persons). However one recommendation was to develop a single clinician-rated measure to cover the domains of symptoms and functioning that would replace the Life Skills Profile (LSP-16+);
- A review of existing non-admitted classifications found that the current Tier 2 Non-Admitted Care Services classification is not appropriate as a long term classification in Australia;

- This review also identified substantial barriers to the adoption of any of the 11 non-admitted classifications identified from the United States, Canada, England, New Zealand and Ireland;
- In July 2013, IHPA commissioned the Australian Institute of Health and Welfare (AIHW) to develop a nationally consistent set of definitions and guidelines for subacute and non-acute care. This project included the development of revised definitions of subacute care and each of the four care types (rehabilitation, palliative care, GEM and psychogeriatrics). This project also found that the term 'non-acute' care is synonymous with 'maintenance' care.
- In 2012, IHPA commissioned the University of Sydney to undertake a review of clinical assessment tools that are or could be used in subacute and non-acute classifications. This project assessed a range of tools based on criteria related to validity, whether the tool showed ceiling or floor effects, sensitivity, clinical utility, time demands and cost of implementation. The main focus of the review, however, was to test how well the tools fit into the World Health Organization's International Classification of Functioning, Disability and Health framework (World Health Organization 2001).

Appendix 3 Initial stakeholder consultation participants

Organisation	Representatives
Victorian Department of Health	Jackie Kearney - Acting Director, Integrated Care Gregory Dalton - Manager, Palliative Care Program Phuong Nguyen - A/Manager Funding Systems Development
Commonwealth Department of Health	Janine Bevan - Director, Activity Based Funding Classification and Pricing Section Jenny Mun, Assistant Director, Activity Based Funding Classification and Pricing Section
ACT Department of Health	Mr Winston Piddington - Manager, Classification and Costing. Ms Prathima Karri - Policy Officer, Funding Modelling and Analysis
NSW Department of Health	Sharon Smith - Manager, SNAP and Mental Health Work Streams, Activity Based Funding Taskforce Alfa D'Amato - Deputy Director, ABF taskforce Debra Hinton - Data System Integration Coordinator, ABF Taskforce Susan Dunn - Manager Work streams, ABF taskforce Xiao Cai - Manager, ED and Non-Admitted work streams (NSW Health)
Northern Territory Department of Health	Amanda Lanagan - Manager, ABF Information Systems Hilary Bloomfield - Business Analysts, ABF Branch (NT Health)
Queensland Health	Catherine Stephens - A/ Team Leader, Allied Health Professions Office of Queensland Don Bahr - Director, Data Collections, Health Statistics Unit. Jeffrey Rowland - Staff Specialist, General Medicine, Metro North Hospital and Health Service Rohan Vora - Staff Specialist, Palliative Care, Gold Coast Hospital and Health Service
Palliative Care Australia	Dr Yvonne Luxford - PCA, Chief Executive Officer
Western Australia	Bing Rivera - Manager, National ABF Team Hanna Seymour - Medical Co-Director Helen Walker - Program Manager, Palliative Care Dr Helen McGowan - Psychiatrist of Old Age Cameron Bell - Senior Project Officer Andy Wu - Senior Policy Officer, Aged and Continuing Care Directorate
Allied Health Professions Australia	Mary Haire - Co-chair, National Allied Health Classification Committee of AHPA
Australasian Rehabilitation Outcomes Collaboration (AROC)	Frances Simmonds - Director AROC Tara Stevermuer - AROC Statistician Jacquelin Capell - AROC Research Fellow
South Australian Department of Health	Shelley Horne - Director, Clinical Service Reform Krystyna Parrott - Manager ABF, Funding Models Data and Reporting Services

Organisation	Representatives
and Ageing	
Tasmanian Department of Health and Human Services	Peter Mansfield - Manager, Health Statistics Valerie Whelan - Program Manager, Activity Based Funding Kevin Ratcliffe - Manager, Casemix Risk
RACP geriatrician representative	Peter Hunter - Geriatrician. Associate Professor and Director of Aged Care, Clinical Program Director, Rehabilitation, Aged and Community Care. Alfred Health
Australasian Rehabilitation Nurses' Association	Terry Wells - ARNA National President
Palliative Care Outcomes Collaboration (PCOC)	• Karen Quinsey - Director, PCOC • Sam Allingham - Statistician, PCOC • Carol Hope - National Quality Manager • Sabina Clapham - National Education Manager • Alanna Holloway – Statistician, PCOC • Linda Foskett – administration officer, PCOC
Royal Australian and New Zealand College of Psychiatrists	• Dr David Lie - Clinical Director, Older Adult Academic & Clinical Unit, Metro South Addiction & Mental Health Service
National Casemix and Classification Centre (NCCC)	• Jenny McNamee - Director, NCCC

Appendix 4 Key findings from the initial stakeholder consultation

Non-care type specific

- Consideration could be given to development of classes at an impairment level only, where no clinical assessment data can be easily provided. This suggestion relates to block funded hospitals; and
- The impact of not using the '90 day' rule on the resource homogeneity of AN-SNAP classes should be tested.

Palliative care

- The core cost drivers for palliative care patients are: stage of illness (phase of care), function, age and acute complications; and
- Family issues can have a major impact in palliative care and should be considered in the classification development process.

Rehabilitation

- The core cost drivers for rehabilitation patients are: function, impairment, age, co-morbidities (particularly in older patients), complications (including those that arise during acute care), social support, initial severity of impairment and equipment requirements; and
- Investigate the use of selective weighted FIM™ item scores rather than total raw scores.

GEM

- The core cost drivers for GEM patients are: function (motor and cognitive), principal diagnosis, secondary diagnoses including comorbidities and acute medical complications, presence or absence of specific diagnoses (delirium, dementia) and social support;
- The first split should continue to be functional status, but delirium is likely to be a cost predictor across all functional levels; and
- ICD-10-AM diagnosis codes should be examined as potential splitting variables for GEM.

Psychogeriatric

- The core cost drivers for psychogeriatric patients are: function, behaviour and risk factors; and
- Principal diagnosis is the major cost driver in psychogeriatric care.

Maintenance (non-acute)

- The core cost drivers for maintenance (non-acute) patients are: function (motor and cognitive) and social support; and
- Change the name of this care type from 'Maintenance' to 'Non-acute'.

The relationship between GEM and rehabilitation

- Class finding for AN-SNAP V4 should be done using an amalgamated rehabilitation and GEM data set. Impairment only collected for rehabilitation but may be replaced by another data element such as principal diagnosis for this purpose; and
- The potential to have splits within classes on the basis of same-day procedures should be investigated.

Paediatrics

- The relatively low volume of paediatric subacute activity warrants developing only a small number of paediatric classes; and
- Clinical tools such as the WeeFIM® should not be included in paediatric subacute classes.

Ambulatory (non-admitted) branches of AN-SNAP

- Several stakeholders (including both clinicians and jurisdictions) expressed a very strong preference for an episode-based classification;
- A similar number of stakeholders expressed a strong preference for a service event based classification; and
- The ambulatory maintenance (non-admitted non-acute) classes in AN-SNAP are not required.

Consultation/liaison services

- Consultation/liaison services should be classified within the ambulatory/non-admitted branches of AN-SNAP.

Same-day episodes

- Whether these patients are treated on a same-day admitted or non-admitted basis reflects jurisdictional and sector differences and should not exist in the classification;
- Numerous services use different systems to record admitted and non-admitted data. It would be a burden on services if separate systems were required to record same-day and overnight admitted activity/clinical assessment scores; and
- Consideration should be given to the issue of intended admitted overnight episodes, which become same-day due to the death or clinical deterioration of a patient, necessitating return to the acute service, versus intended same-day episodes. These may have very different resource utilisation.

Appendix 5 Clinical committee membership lists

Rehabilitation clinical committee

Name	Position	Organisation
Associate Professor Chris Poulos (Chair)	Hammond Chair of Positive Ageing and Care	School of Public Health and Community Medicine
Maria Crotty	Professor and Director of Rehabilitation	Repatriation General Hospital
Dr Peter New	Head, Spinal Rehabilitation Unit	Alfred Health
Dr Joe Gurka	Rehabilitation physician	Westmead Hospital
Associate Professor Stephen Faux	Director Rehabilitation Unit	St Vincent's Public Hospital
Sharon Smith	Manager, SNAP and Mental Health Work Streams,	Activity Based Funding Taskforce, NSW Health
Amanda Mulcahy	Project coordinator	WA Department of Health
Jo Goodridge	APHA Nominee	Australian Private Hospitals Association
Monique Berger	Rehabilitation nurse	
Professor Kathy Eagar	Director, AHSRI	University of Wollongong
Associate Professor Rob Gordon	Deputy Director, AHSRI	University of Wollongong
Associate Professor Janette Green	Director, CASiH	University of Wollongong
Ms Maree Banfield	Senior Research Fellow	University of Wollongong
Dr Conrad Kobel	Research Fellow	University of Wollongong

Palliative care clinical committee

Name	Position	Organisation
Associate Professor Richard Chye (Chair)	Network Director, Palliative Care, Northern Sector, South East Sydney LHD & St Vincent's Health Network	South East Sydney Local Health District & St Vincent's Health Network
Associate Professor Mark Boughey	Co-Deputy Director Centre for Palliative Care & Director of Palliative Medicine	St Vincent's Hospital Melbourne
Dr Carol Douglas	Medical Director - Palliative Care, Palliative Care Consultation Team	Royal Brisbane and Women's Hospital
Ms Karen Pervogal	Director of Subacute Nursing	Modbury Hospital
Ms Bronwyn Hewitt	Senior Physiotherapist	Sacred Heart Palliative Care Service, NSW
Ms Attracta Gorman	Palliative care nurse	Ringwood Private Hospital
Mr Andrew Allsop	Support Manager Psychosocial and Spiritual Service	Silver Chain - Hospice Care Service

Name	Position	Organisation
Associate Professor Rob Gordon	Deputy Director, AHSRI	University of Wollongong
Associate Professor Janette Green	Director, CASiH	University of Wollongong
Ms Maree Banfield	Senior Research Fellow	University of Wollongong
Dr Conrad Kobel	Research Fellow	University of Wollongong

GEM clinical committee

Name	Position	Organisation
Professor Kathy Eagar (Chair)	Director, AHSRI	University of Wollongong
Associate Professor Craig Whitehead	President, Australian and New Zealand Society of Geriatric Medicine	Daw Park Repatriation Hospital
Associate Professor Peter Hunter	Clinical Program Director Rehabilitation, Aged and Community Care.	Alfred Health, Caulfield Hospital
Dr Hannah Seymour	Geriatrician	Royal Perth Hospital
Dr Edward Strivens	Clinical Director, Older Persons Health Services	Cairns and Hinterland Hospital and Health Service
Ms Elizabeth Endean	Clinical Nurse Consultant	St Vincent's Hospital, Sydney
Ms Sharon Smith	Manager, SNAP and Mental Health Work Streams, Activity Based Funding Taskforce	NSW Department of Health
Ms Jan Erven	Manager Extended Care Services, Illawarra Shoalhaven Local Health District	AHSRI Project team, University of Wollongong
Associate Professor Rob Gordon	Deputy Director, AHSRI	University of Wollongong
Associate Professor Janette Green	Director, CASiH	University of Wollongong
Ms Maree Banfield	Senior Research Fellow	University of Wollongong
Dr Conrad Kobel	Research Fellow	University of Wollongong
Ms Megan Blanchard	Research Fellow	University of Wollongong

Paediatric clinical committee

Name	Position	Organisation
Dr Lynne McKinlay (Chair)	Director, Department of Paediatric Rehabilitation	Children's Health Queensland Hospital and Health Service
Dr Ray Russo	Director, Paediatric Rehabilitation Department Women's and Children's Hospital, Women's and	Women's and Children's Health Network, South Australia

Name	Position	Organisation
	Children's Health Network	
Dr Jane Valentine	Paediatric rehabilitation specialist	Princess Margaret Hospital For Children
Ms Tracey Dawson	Program manager for Paediatric Rehabilitation in WA	
Ms Lynn McCartney	Rehabilitation Clinical Nurse Consultant	The Children's Hospital, Westmead
Dr Adrienne Epps	Paediatric rehabilitation specialist	Sydney Children's Hospital
Ms Joannah Tozer		Victorian Paediatric Rehabilitation Service
Dr Anthony Herbert	Staff Specialist in Paediatric Palliative Care	Royal Children's Hospital, Brisbane
Ms Lee-anne Pedersen		Royal Children's Hospital, Brisbane
Dr Martha Mherekumombe	Consultant in Paediatric Palliative Care	Sydney Children's Hospital Network
Ms Stephanie Dowden	Clinical Nurse Consultant for Paediatric Palliative Care	Princess Margaret Hospital For Children
Ms Julie Duffield	Clinical Practice Consultant, Women's and Children's Hospital, Women's and Children's Health Network	Women's and Children's Health Network, South Australia
Mr James Stormon	Clinical Program Director	Sydney Children's Hospital Westmead
Ms Lauren Bayliss	Coordinator / Occupational Therapist, Paediatric Rehabilitation Department	Women's and Children's Hospital, South Australia
Ms Karen Height	Service Manager, Kaleidoscope Paediatric Rehabilitation Service	Hunter New England Local Health District
Ms Penny Ireland	Physiotherapy Team Leader for (QPRS)	Queensland Paediatric Rehabilitation service
Associate Professor Rob Gordon	Deputy Director, AHSRI	University of Wollongong
Associate Professor Janette Green	Director, CASiH	University of Wollongong
Ms Jenny McNamee	Senior Research Fellow	University of Wollongong
Ms Meg Blanchard	Research Fellow	University of Wollongong

Psychogeriatric clinical committee

Name	Position	Organisation
Professor Kathy Eagar (Chair)	Director, AHSRI	University of Wollongong
Dr Roderick McKay	Acting Director Specialist Mental Health Services for Older People	SLHD & SWSLHD
Dr Janine Stevenson	Consultant Psychiatrist	Westmead Hospital
Associate Professor Peter Hunter	Clinical Program Director Rehabilitation, Aged and Community Care.	Alfred Health, Caulfield Hospital
Associate Professor Craig Whitehead	President, Australian and New Zealand Society of Geriatric Medicine	Daw Park Repatriation Hospital
Ms Sharon Smith	Manager, SNAP and Mental Health Work Streams, Activity Based Funding Taskforce	NSW Department of Health
Ms Jan Erven	Manager Extended Care Services, Illawarra Shoalhaven Local Health District	Shoalhaven Local Health District
Associate Professor Rob Gordon	Deputy Director, AHSRI	University of Wollongong
Associate Professor Janette Green	Director, CASiH	University of Wollongong
Ms Meg Blanchard	Research Fellow	University of Wollongong
Dr Conrad Kobel	Research Fellow	University of Wollongong

Appendix 6 AN-SNAP V4 Workshop participants

Name	Organisation
Associate Professor Rob Gordon	University of Wollongong
Associate Professor Janette Green	University of Wollongong
Dr Conrad Kobel	University of Wollongong
Dr Tony Sherbon	Independent Hospital Pricing Authority
Ms Alix Higgins	Independent Hospital Pricing Authority
Ms Caroline Coevoet	Independent Hospital Pricing Authority
Ms Jenny Munn	Australian Government Department of Health
Ms Megan Magennis	Australian Private Hospitals Association
Associate Professor Richard Chye	NSW Ministry of Health
Ms Sharon Smith	NSW Ministry of Health
Ms Debra Hinton	NSW Ministry of Health
Ms Susan Dunn	NSW Ministry of Health
Ms Amanda Bresnan	Palliative Care Australia
Mr Bill Stomfay	Queensland Health
Dr Lynne McKinlay	Children's Health Queensland Hospital and Health Service
Dr Penny Ireland	Children's Health Queensland Hospital and Health Service
Mr Ralph Cruickshank	South Australian Department of Health
Mr Greg Dalton	Victorian Department of Health
Mr Phuong Nguyen	Victorian Department of Health
Ms Julie Connell	Queensland Department of Health
Ms Nicolle Predll	Australian Health Service Alliance

Appendix 7 The AN-SNAP V4 four-character numbering system (NCCC)

Character 1

Item	Codes	Description
AN-SNAP version	4	Version number

Character 2

Item	Codes	Description
Care type and treatment setting – *overnight classes*	A	Adult rehabilitation
	B	Adult palliative care
	C	Adult geriatric evaluation and management
	D	Adult psychogeriatric care
	E	Adult non-acute care
	F	Paediatric rehabilitation
	G	Paediatric palliative care
Care type and treatment setting – *same-day classes*	J	Adult rehabilitation
	K	Adult palliative care
	L	Adult geriatric evaluation and management
	M	Adult psychogeriatric care
	O	Paediatric rehabilitation
	P	Paediatric palliative care
Care type and treatment setting – *non-admitted classes*	S	Adult rehabilitation
	T	Adult palliative care
	U	Adult geriatric evaluation and management
	V	Adult psychogeriatric care
	X	Paediatric rehabilitation
	Y	Paediatric palliative care
Error class	9	Grouping variable missing

Character 3

Applies to	Information coded	Codes	Description
Adult rehab classes	Single impairment*	A	Stroke
		B	Brain Dysfunction
		C	Neurological Conditions
		D	Spinal Cord Dysfunction
		E	Amputation of Limb
		F	Arthritis
		G	Pain Syndromes
		H	Orthopaedic Conditions – Fracture
		I	Orthopaedic Conditions – Replacement
		J	Orthopaedic Conditions – Other
		K	Cardiac
		L	Pulmonary
		M	Burns
		N	Congenital Deformities
		O	Other Disabling Impairments
		P	Major Multiple Trauma
		Q	Developmental Disabilities
		R	Reconditioning
	Impairment group	1	All orthopaedic conditions
		2	Orthopaedic conditions – replacement and other
		3	Cardiac, pain and pulmonary
		9	Other impairments
	Assessment only	Y	Assessment only
	Low function	Z	Weighted FIM™ motor ≤18
Adult palliative care classes	Palliative care phase	S	Stable phase
		U	Unstable phase
		D	Deteriorating phase
		T	Terminal phase
Paediatric classes	---	0	---
Admitted GEM classes	Motor function	L	FIM motor 13-17
		M	FIM motor 18-56
		H	FIM motor 57-97
Non-admitted GEM classes	Clinic type	C	Clinic type
Admitted psychogeriatric and non-acute classes	Length of stay	L	LOS ≥ 92 days
		S	LOS ≤ 91 days
Non-admitted psychogeriatric classes	Focus of care	A	Acute
		N	Non-acute
Same-day classes	---	0	---
Error classes	Ungroupable	9	Grouping variable missing

*a code is included for each impairment group although some impairments are grouped together and their individual code is not used in V4

Character 4

Item	Codes	Description
Sub-group number	1,2,3	Sequential numbering of classes after the first split
Error classes	A	Admitted adult rehabilitation – ungroupable
	B	Admitted adult palliative care – ungroupable
	C	Admitted geriatric evaluation and management – ungroupable
	D	Admitted psychogeriatric care – ungroupable
	E	Admitted non-acute care – ungroupable
	F	Admitted paediatric rehabilitation – ungroupable
	G	Admitted paediatric palliative care – ungroupable
	S	Non-admitted adult rehabilitation - ungroupable
	T	Non-admitted adult palliative care - ungroupable
	U	Non-admitted geriatric evaluation and management – ungroupable
	V	Non-admitted psychogeriatric care - ungroupable
	X	Non-admitted paediatric rehabilitation – ungroupable
	Y	Non-admitted paediatric palliative care – ungroupable
	9	All other ungroupable – occurs when there is an error with Episode Type, Care Type or Age

AN-SNAP Error Classes

Adult Error Classes

Class	Admitted	Non-Admitted
Rehabilitation	499A	499S
Palliative care	499B	499T
GEM	499C	499U
Psychogeriatric	499D	499V
Non-Acute	499E	-

Paediatric Error Classes

Class	Admitted	Non-Admitted
Rehabilitation	499F	499X
Palliative care	499G	499Y

All other ungroupable

Class	Description
4999	Occurs when there is an error with Age, Care Type or Episode Type

Appendix 8 Options for Psychogeriatric AN-SNAP

AN-SNAP development – options for the Psychogeriatric Care Type

Background

The Centre for Health Service Development (CHSD), University of Wollongong has recently completed a project to develop version 4 of the AN-SNAP classification.

In parallel, IHPA is commissioning a series of projects to develop a new national mental health care classification. This work includes the national adoption of a new 'Mental Health Care Type' that overlaps with the Psychogeriatric Care Type. This work thus has the potential to impact on the psychogeriatric branch of AN-SNAP.

The attachment to this paper gives the definitions of the Psychogeriatric and the Mental Health Care Types. It also includes the definition of the GEM Care Type. The definition of the GEM Care Type is included because clinicians are reporting that the GEM patient population now includes an increasingly large percentage of patients with a range of cognitive impairments and behavioural issues. If this is the case, the Psychogeriatric Care Type can be regarded as now sitting somewhere in between the Mental Health and GEM Care Types.

AN-SNAP V4

Analytical work to develop AN-SNAP V4 has recently been completed. This includes work on the psychogeriatric branch of the classification. However, the data available for the psychogeriatric branch analysis were very limited. The only new clinical items available for analysis were diagnosis and intervention codes. Accordingly, AN-SNAP V4 includes only minimum changes to the current psychogeriatric branch.

Options for the future casemix classification of psychogeriatric care

Option One: Plan to classify all psychogeriatric care, regardless of treatment setting, according to the mental health classification once it is developed

This option would see all psychogeriatric care, regardless of treatment setting, classified according to the mental health classification once it is developed. As such, the current AN-SNAP psychogeriatric classes would be phased out once the new mental health classification is available.

Option Two: Plan to include classes for psychogeriatric care in both the mental health and future versions of the AN-SNAP classification

In practice, older patients with mental health and/or behavioural disturbance are treated in both the mental health and the subacute geriatric sectors. This poses practical problems if, for example, the mental health classification uses classification variables that are not routinely captured in the geriatric sector, or fails to include patients currently included within the psychogeriatric care type (particularly those with dementia).

If option two were adopted, there would need to be clear rules regarding which classification system a given episode of care was included within. The possible approaches are:

- The classification could be selected based on the type of unit in which the care is provided. Clinical units/hospitals classifying other patients by use of the mental health classification would use the new mental health care classification to classify psychogeriatric patients. Clinical units/hospitals using AN-SNAP to classify their other patients would use the AN-SNAP classification to classify their psychogeriatric patients.
- A hierarchy of classifications is overt in which the mental health classification is applied first, and relevant episodes that either do not meet these criteria, or for which mental health specific data cannot be provided, are classified within the AN-SNAP classification

However, this option raises the possibility that a different approach might be pursued in version 5. The options for version 5 are:

2.1 Maintain the overall branch structure of the AN-SNAP classification for both admitted and non-admitted care. That is, there would continue to be two psychogeriatric branches, one for inpatient episodes and one for ambulatory episodes.

There are two further sub options under Option 2.1:

2.1.1 Maintain the two psychogeriatric branches but populate them with classes that are identical to those in the mental health care classification. Under this approach a patient would be classified to the same class irrespective of the classification or the setting of treatment.

2.1.2 Maintain the two psychogeriatric branches and populate them with revised classes that are developed as part of the development of AN-SNAP Version 5.

2.2 Reduce the number of care types within the AN-SNAP classification from 5 to 4 – (1) Palliative Care (2) Rehabilitation (3) Aged Mental Health and (4) Supportive (non-acute) care.

The Aged Mental Health Care branch would, in effect, be an amalgamation of the current GEM and Psychogeriatric branches. All patients currently classified under the psychogeriatric care type would be assigned to this branch. Patients currently classified under the GEM care type would be assigned:

- To the aged mental health care branch if they have significant cognitive, behavioural or mental health problems; or
- To the rehabilitation or the supportive care branch if they do not have significant cognitive, behavioural or mental health problems.

2.3 Define care types differently according to setting. For example, option 2.1 above could be adopted for admitted episodes but option 2.2 adopted for non-admitted episodes.

Definitions of the relevant care types

Mental health

Mental health care is care in which the primary clinical purpose or treatment goal is improvement in the symptoms and/or psychosocial, environmental and physical functioning related to a patient's mental disorder. Mental health care:

- Is delivered under the management of, or regularly informed by, a clinician with specialised expertise in mental health;
- Is evidenced by an individualised formal mental health assessment and the implementation of a documented mental health plan; and
- May include significant psychosocial components including family and carer support.

Psychogeriatric

Psychogeriatric care is care in which the primary clinical purpose or treatment goal is improvement in the functional status, behaviour and/or quality of life for an older patient with significant psychiatric or behavioural disturbance. The disturbance is caused by mental illness, age related organic brain impairment or a physical condition. Psychogeriatric care is always:

- Delivered under the management of or informed by a clinician with specialised expertise in psychogeriatric care, and
- Evidenced by an individualised multidisciplinary management plan which is documented in the patient's medical record. The plan must cover the physical, psychological, emotional and social needs of the patient, as well as include the negotiated goals within indicative time frames and formal assessment of functional ability.

Geriatric evaluation management

Geriatric evaluation and management (GEM) is care in which the primary clinical purpose or treatment goal is improvement in the functioning of a patient with multi-dimensional needs, associated with age related medical conditions. Some examples of conditions in GEM care patients include a tendency to fall, incontinence, reduced mobility and cognitive impairment. The patient may also have complex psychosocial problems. GEM care is always:

- Delivered under the management of or informed by a clinician with specialised expertise in GEM care, and
- Evidenced by an individualised multidisciplinary management plan which is documented in the patient's medical record. The plan must cover the physical, psychological, emotional and social needs of the patient, as well as include negotiated goals within indicative time frames and formal assessment of functional ability.