Development of the Australian National Subacute and Non-Acute Patient Classification Version 5.0

Final Report

December 2021

IHPA

Development of the Australian National Subacute and Non-Acute Patient Classification Version 5.0 – Final report – December 2021

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Acronyms and abbreviations

Acronym / Abbreviation	Description
ABF	Activity based funding
ACS	Australian Coding Standards
AHRSI	Australian Health Services Research Institute – University of Wollongong
AMHCC	Australian Mental Health Care Classification
ANZSGM	Australian and New Zealand Society for Geriatric Medicine
AN-SNAP	Australian National Subacute and Non-Acute Patient Classification
APC	Admitted Patient Care data collection
AR-DRG	Australian Refined Diagnosis Related Group
AROC	Australasian Rehabilitation Outcomes Centre
ASNAHC NBEDS	Admitted Subacute and Non-Acute Hospital Care National Best Endeavours Data Set
CART	Classification And Regression Tree model
CCI	Charlson Comorbidity Index
CoV	Coefficient of Variation
FIM™	Functional Independence Measure
FRIC	Frailty Related Index of Comorbidities
GEM	Geriatric evaluation and management care type
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
LoS	Length of stay
MMT	Major multiple trauma
NHCDC	National Hospital Cost Data Collection
PCOC	Palliative Care Outcomes Collaboration
RID	Reduction in deviance
RUG-ADL	Resource Utilisation Groups - Activities of Daily Living
SCWG	Subacute Care Working Group
SMMSE	Standardised Mini-Mental State Examination
WFIM™	Weighted Functional Independence Measure

1. Executive summary

The Independent Hospital Pricing Authority (IHPA) is responsible for the development of the Australian National Subacute and Non-Acute Patient Classification (AN-SNAP). AN-SNAP is a casemix classification used for activity based unding (ABF), clinical management and other purposes.

IHPA has developed AN-SNAP Version 5.0 (V5) through detailed statistical analysis of public hospital activity and cost data, as well as consultation with jurisdictions, clinical experts and other subacute care stakeholders. This report details AN-SNAP V5 and describes the development process and the rationale for major changes.

Overall, AN-SNAP V5 is a modest refinement of AN-SNAP Version 4.0 (V4). The fundamental structure is retained with the five care types: palliative care, rehabilitation, psychogeriatric care, geriatric evaluation and management (GEM) and non-acute care.

The admitted branch of the AN-SNAP V5 classification has been simplified from 103 to 97 end-classes (83 admitted overnight; six admitted same-day; and eight ungroupable error classes). Together, these explain 54.3 per cent of the variation of Australian public hospital subacute care costs, which is a 0.4 per cent improvement on the 53.9 per cent explained by AN-SNAP V4.

The most substantial improvements in explanation of cost variation are for the GEM and non-acute care types. This is the result of AN-SNAP V5 introducing a new variable, derived from diagnosis codes, to recognise the impact of frailty related comorbidities as cost drivers for GEM and non-acute care: the Frailty Related Index of Comorbidities (FRIC).

Other key changes introduced into AN-SNAP V5 are:

- creating a new impairment type group for joint replacement (shoulder, hip and knee) episodes in the rehabilitation branch

- updating the impairment-specific weights which are applied to the Functional Independence Measure (FIM^{TM}) Motor scores

- switching the order that the FIM^{TM} sub-scores for motor and cognitive function are applied to group rehabilitation brain dysfunction episodes, that is, applying FIM^{TM} Cognition first and then weighted FIM^{TM} Motor

- removing whether a patient has a dementia or delirium diagnosis as a splitting variable for GEM care (but accounting for both these diagnoses as part of the new FRIC)

- using the Health of the Nation Outcome Scale (HoNOS) 65+ Total Score to group psychogeriatric care rather than the HoNOS sub scores for overactive behaviour and activities of daily living

- removing the Resource Utilisation Groups - Activities of Daily Living as a variable for non-acute care

- updating the splitting thresholds for several variables to improve the statistical performance of the classification.

The components of AN-SNAP V4 that have not changed are:

- the same-day classes for rehabilitation, palliative care, GEM, and psychogeriatric care

- the classification structure and thresholds for adult palliative care

- the structure and splitting thresholds for paediatric rehabilitation and paediatric palliative care

- the four character class labelling system.

To complement the AN-SNAP V5 changes, IHPA is also proposing to further investigate the usefulness and feasibility of adding the following to the Admitted Subacute and Non-acute Hospital Care National Best Endeavours Data Set from 1 July 2023:

- the Rockwood Clinical Frailty Scale - so it may be further investigated as a prospective measure for assessing patient frailty in subacute admitted settings

- the WeeFIM® (the paediatric version of the FIM[TM]) - so it may be investigated as potential new variable classifying paediatric subacute care.

2. Introduction

Under the National Health Reform Agreement 2011, the Independent Hospital Pricing Authority (IHPA) is responsible for determining the activity based funding (ABF) system for public hospital subacute and non-acute care services. The classification system used for admitted subacute and non-acute care ABF in Australia is the Australian National Subacute and Non-Acute Patient classification (AN-SNAP).

2.1   Subacute care and AN-SNAP

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]

This focus on optimising function is fundamentally different to the primary objectives of acute care. It means that the approach to classification for acute care, which is based around patient diagnoses and procedures, is not appropriate for subacute care.

AN-SNAP has been developed specifically for subacute care. It is used for funding as well as clinical management and other purposes such as benchmarking, epidemiological studies, safety and quality monitoring, and research to understand practice and cost variation.

AN-SNAP is a casemix classification made up of four subacute care types: rehabilitation, palliative care, geriatric evaluation and management (GEM) and psychogeriatric care; and one non-acute care type sometimes referred to as maintenance care. These five care types within AN-SNAP recognise that subacute and non-acute 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.

2.2   Overview of AN-SNAP V4

AN-SNAP was first developed in 1997 and has been refined three times since then. The most recent version, AN-SNAP Version 4.0 (V4), was released in May 2015 and has been used to price admitted subacute and non-acute care since 1 July 2016.

Like all ABF classification systems, AN-SNAP sorts patient episodes of care into groups (called classes). This is done using variables, which can be categorical (describing a 'quality' or 'characteristic' of something) or numeric (describing a measurable quantity as a number). The variables are applied to the groups in a particular order to progressively break the groups down

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[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.

into meaningful sets, with each step in this process called a 'split'. If a numeric variable is used to split a group, it does this using set numbers as upper and/or lower thresholds for the group.

In AN-SNAP, the episodes are first grouped using episode type as a categorical variable (admitted - including both overnight and same day; and non-admitted). The next step is to split those two groups into smaller groups using another categorical variable: care types (rehabilitation, palliative care, GEM, psychogeriatric care and non-acute care). There are then several further splits of the care type episodes using a mix of categorical and numeric variables. The variables used in the most recent version AN-SNAP V4 are listed in Table 1.

Table 1. AN-SNAP V4 variables

Care Type	Splitting variables
Rehabilitation	Impairment type Functional Independence Measure (FIM^{TM}) Motor score (weighted) FIM^{TM} Cognition score Age
Palliative care	Palliative care phase (stage of illness) Resource Utilisation Groups – Activities of Daily Living (RUG-ADL) total score Age
GEM	FIM^{TM} Motor score Dementia and/or delirium flag (International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification (ICD-10-AM) diagnosis codes)
Psychogeriatric	Length of stay (Long term care > 91 day & shorter term care <= 91 days) Health of the Nation Outcome Scale (HoNOS) 65+ (Overactive Behaviour, Activities of Daily Living (ADL) and total)
Non-acute	Length of stay (Long term care > 91 & shorter term care <= 91 days) Age RUG -ADL

In total, AN-SNAP V4 has 103 admitted end-classes (89 classes for overnight subacute episodes/phases; six classes for subacute same-day admissions; and eight error classes). The non-admitted branch, which is not used for ABF, has 35 classes.

3. Developing AN-SNAP V5

The Independent Hospital Pricing Authority (IHPA) undertakes regular reviews of all activity based funding (ABF) classifications to ensure that they reflect contemporary clinical practice and terminology; and provide the best possible statistical explanation of care costs.

3.1 Objectives and overview

IHPA started this review of the Australian National Subacute and Non-Acute Patient Classification (AN-SNAP) as part of its 2018–19 work plan. Broadly, the scope of the project was to refine AN-SNAP by:

- using the improved volume and coverage of subacute data collected since 2015 to assess the statistical performance of AN-SNAP Version 4.0 (V4) variables and recommend any changes to optimise the performance of these

- working with clinical and other experts to identify other variables that could be added to the classification; and test the statistical impact of these using national data

- developing a draft AN-SNAP Version 5.0 (V5) and consulting widely about its use

- providing the Pricing Authority with a set of recommendations about the next version of AN-SNAP.

The non-admitted branch of AN-SNAP was excluded from the scope of the project because IHPA does not use AN-SNAP to price non-admitted subacute care. Instead, it is priced through the **Tier 2 Non-Admitted Services Classification**, which is currently being reviewed as part of the development of a new **non-admitted care classification**.

3.2 Governance and consultation

IHPA relies on a comprehensive **committee framework** to provide expert advice during its work. The main advisory group for this project was IHPA's Subacute Care Working Group (SCWG), a group of expert representatives from each Australian jurisdiction, the private sector and subacute care clinicians and clinical bodies. Further details about the membership of the SCWG is at **Appendix A**.

At various points in the project IHPA has also consulted with additional specialist bodies and committees including:

- IHPA's Clinical Advisory Committee

- IHPA's Jurisdictional Advisory Committee

- specialist, time-limited rehabilitation and geriatric evaluation and management (GEM) clinical subgroups

- Australian and New Zealand Society for Geriatric Medicine.

IHPA released a draft version of AN-SNAP V5 for four weeks' public consultation from 12 April 2021 to 10 May 2021. Fifteen submissions were received: five from jurisdictions, five from peak/representative organisations, one from a research/advisory organisation, and four from local health networks or other clinical organisations (**Appendix B**).

> **Consultation spotlights**
>
> All of the public consultation submissions are available at **IHPA's website**. In addition, key committee and public consultation feedback (and IHPA's response) is highlighted as 'Consultation spotlights' at various points throughout this report.

3.3   Decision principles

AN-SNAP V5 has been developed through detailed and robust statistical data analysis and consultation with clinical experts.

IHPA has made its decisions to accept, reject, or modify options by balancing the decision principles outlined in Table 2, which have been refined for this project following their use in the development of AN-SNAP V4[2] and other ABF classifications.

Table 2. Classification development decision principles

Principle	Summary description
Comprehensive, mutually exclusive and consistent	The classification covers all possible cases (episodes) and the classes it creates are well defined, and mutually exclusive.
Resource use homogeneity	Patient episodes within a class have a similar level of resource utilisation, and there is a large variation in resource utilisation between classes.
Clinically coherent and meaningful	Patient episodes within a class have similar characteristics (with respect to impairments, patient functioning or interventions delivered) and make sense as a group to clinicians.
Progressively developed	Where possible, the classification is developed and refined progressively, recognising previous investments.
Administrative and operational feasibility	The benefits of the data collected for the classification should outweigh the administrative cost and burden of collection.
Classification soundness	The classification should have a manageable, balanced number of classes which are statistically robust and relatively stable.
Simple and transparent	A classification should have as many classes as is needed for its purpose but no more, and the grouping to classes should be transparent and clinically sensible.
Minimise undesirable and/or inadvertent consequences	The classification minimises using data elements that are susceptible to different interpretation and/or provide incentives to change reporting to optimise funding.
Capacity for improvement	Where possible, the structure and elements of the classification should allow for future improvements.
Useful beyond ABF, where possible	Where possible, the structure and elements of the classification should be useful for purposes other than funding.

3.4   Data

To develop AN-SNAP V5, IHPA has used a patient activity and cost data set from the:

- National Hospital Cost Data Collection (NHCDC) (2015–16, 2016–17 and 2017–18)
- Admitted Patient Care (APC) data collection (2015–16, 2016–17 and 2017–18).

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2 Green J, Gordon R, Blanchard M, Kobel C and Eager K. (2015), ***Development of AN-SNAP Version 4: Final Report***, Centre for Health Service Development, University of Wollongong.

There was also some targeted analysis of rehabilitation data from the private sector subacute dataset (Hospital Casemix Protocol) (2018–19).

As is evident from Table 3, this was a considerably larger volume and coverage of episodes than was available for AN-SNAP V4 development. Accordingly, the AN-SNAP V5 development process has allowed for robust statistical investigation of the classification's performance in conjunction with considerable clinical input.

Table 3. Comparing volume and coverage of episode records available for analysis for AN-SNAP V4 and AN-SNAP V5

Care type	AN-SNAP V5 modelling - Number of records[2]	AN-SNAP V4 modelling - Number of records[1]
Rehabilitation	289,344	14,356
Palliative care	213,470	20,172
GEM	103,292	238
Psychogeriatric	4,246	1,712
Non-acute	82,765	745
Invalid care type records (i.e. missing or invalid)	1,524	Unknown
Total	694,641	37,223

(1)   Sourced from Green J, Gordon R, Blanchard M, Kobel C and Eager K. (2015), ***Development of AN-SNAP Version 4: Final Report,*** Centre for Health Service Development, University of Wollongong

(2)   For comparative purposes the AN-SNAP V5 number of records reported here reflects overnight episodes excluding same-day or long-term episodes created by merging the National Hospital Cost Data Collection and Admitted Patient Care data for 2015–16, 2016–17, and 2017–18 not excluding trimmed episodes with missing cost, error records etc.

3.4.1   Data preparation

IHPA applied several steps to prepare a quality data set for the AN-SNAP V5 modelling.

This involved excluding the following types of data from the modelling dataset (known as 'trimming'):

- extreme outliers that may skew the statistical results
- incorrect data entries due to operational/human error
- data entries with truncated cost information.

Table 4 details the AN-SNAP V5 trimming stages / criteria.

Table 4. Data preparation - trimming criteria

Stage	Trimming criteria	Description
1	APC or NHCDC error records	Filters out episodes with invalid care types, missing birth date, admission date or separation date, invalid date combinations (e.g. admission date being earlier than separation date), and having at least one cost bucket being less than -$100.
2	Missing, $0 or negative cost records	Filters out episodes with missing or negative in-scope cost (i.e. sum of relevant cost buckets being 0 or less).
3	Non-phase palliative care records	For palliative records only – filters out episodes with invalid or missing phase information.
4	Error AN-SNAP class records	Filters out episodes that are error AN-SNAP class from AN-SNAP V4.
5	'Work in Progress' records	Episodes that span reporting periods - represent episodes with admission dates earlier than the start of the corresponding financial year.
6	Extreme low cost records	Filters out extreme low outlier cost episodes. This is done by ranking observations by cost and identifying an extreme decrease in cost over 75 per cent from the previous observation.
7	Extreme high cost records	Filters out extreme high outlier cost episodes. This is done by ranking observations by cost and identifying an extreme increase in cost over 200 per cent from the previous observation.
8	Extreme cost ratios	Filters out episodes with extreme high or low cost ratios. This is done by deriving a preliminary regression model using length of stay and AN-SNAP V4.0, and removing episodes with extremely high or low cost ratios.
9	Palliative records with missing Resource Utilisation Groups - Activities of Daily Living (RUG-ADL)	For palliative records only – filters out episodes with invalid RUG-ADL Total, or missing RUG-ADL Total for phase types that require this variable to group.

Table 5 below summarises the trimming stages and the number of episodes trimmed at each stage.

Table 5: Number of episodes trimmed at each data preparation stage for statistical analysis

Record trimming stage		2015–16	2016–17	2017–18	Total
Initial episode/phase-activity of admitted subacute and non-acute records		231,832	229,279	233,530	694,641
LESS Total trimmed episodes		79,564	63,746	39,221	182,531
(1)	APC or NHCDC error records	9,893	17,870	10,586	38,349
(2)	Missing, $0 or negative cost records	34,824	30,471	13,034	78,329
(3)	Non-phase palliative care records	1,438	1,321	1,242	4,001
(4)	Error SNAP class records	26,969	6,867	6,096	39,932
(5)	'Work in Progress' records	5,571	6,840	7,635	20,046
(6)	Extreme low cost records	26	5	8	39
(7)	Extreme high cost records	2	6	2	10
(8)	Extreme cost ratios	419	332	599	1,350
(9)	Palliative records with missing RUG-ADL	422	34	19	475
Resulting sample size of episodes/phases		152,268	165,533	194,309	512,110

3.5 Optimising the existing AN-SNAP variables

IHPA's first priority was to use the latest subacute data set to conduct detailed analysis of the characteristics and performance of the existing classification.

3.5.1 The benchmark AN-SNAP V4 statistical performance

IHPA uses the Reduction in Deviance (RID) statistic to assess the statistical performance of a classification, or part of a classification. The RID measures how much of the variability in cost is explained by the system. IHPA usually reports RID as a percentage, so the higher the percentage value, the higher the percentage of cost variation that is explained by the system.

The benchmark RID performance of AN-SNAP V4 is presented in Table 6.

Table 6. AN-SNAP V4 statistical performance (Reduction in Deviance) by care type

Care type	Subgroup	Episodes	# classes	Reduction in Deviance (RID)
Adult rehabilitation care	Same Day	78,289	1	0.0%
	Overnight	152,204	50	22.1%
	All	230,493	51	74.0%
Paediatric rehabilitation care	Same Day	2,751	1	0.0%
	Overnight	1,106	5	9.6%
	All	3,857	6	77.6%
Adult palliative care	Same Day	3,808	1	0.0%
	Overnight	135,208	12	7.5%
	All	139,016	13	11.9%
Paediatric palliative care	Same Day	35	1	0.0%
	Overnight	322	4	3.1%
	All	357	5	23.7%
Geriatric evaluation and management care	Same Day	499	1	0.0%
	Overnight	82,085	6	4.9%
	All	82,584	7	8.2%
Psychogeriatric care	Same Day	85	1	0.0%
	Short Term	2,844	5	0.6%
	Long Term	87	1	0.0%
	All	3,016	7	25.7%
Non-acute (maintenance) care	Short Term	52,202	5	1.2%
	Long Term	586	1	0.0%
	All	52,788	6	15.4%
TOTAL		512,110	6 same-day 89 overnight 8 ungroupable	53.9%

It is important to note that the statistical performance of the classification (or part of a classification), as represented by RID, does not indicate how 'effectively' those services are priced for ABF purposes. Ultimately, the price of admitted subacute and non-acute activity is

determined by the classification in combination with a range of adjustments and cost parameters that are applied through the national pricing model.[3]

3.5.2 Method

Broadly, this first stage involved IHPA analysing the improved volume and coverage of activity and cost data collected since AN-SNAP V4 was implemented to test how well the existing variables in each care type (as summarised in Table 1) explained resource use.

The focus of this stage was on understanding the extent to which any changes to the thresholds applied to the existing variables could improve:

- the adequacy of how episodes were distributed within the splitting variable (episode volume)
- how well the variable explained cost of the episodes of care (cost prediction).

IHPA established specialist, time-limited rehabilitation and GEM clinical subgroups to advise during this initial investigation of the threshold settings.

3.5.3 Summary of the outcome

IHPA conducted this first stage analysis for rehabilitation, palliative care, GEM, psychogeriatric, and non-acute care types. Overall, it demonstrated that the classification's statistical performance could only be marginally improved (by 0.1 per cent RID) by adjusting the thresholds of the existing variables. This supported the decision to explore potential new variables.

3.6 Exploring potential new variables

The second part of the AN-SNAP V5 development process involved IHPA working with subacute clinical specialists and other stakeholders to identify potential new, clinically relevant variables, which could be introduced into the classification to improve its statistical performance.

IHPA prioritised two concepts to investigate as potential new variables on the basis of clinical advice and consideration of high volume and high average costs episodes:

- patient frailty (or risk of frailty) as a measure of complexity; and/or
- patient comorbidities.

Other variables considered for each care type but not progressed are noted throughout the discussion in Chapter 4.

3.6.1 Method

IHPA worked with the SCWG (and other committees) to develop and test options for new variables using both statistical analyses and clinical input. A high level summary of the method is illustrated in Figure 1.

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[3] See, for example, Independent Hospital Pricing Authority, **National Pricing Model 2021-22 – Technical Specifications – March 2021**

Figure 1. Method to assess new variables for AN-SNAP V5

Step 1:
Identify new variables

Step 2:
Short list potential variables (CART Algorithm)

Step 3:
Simulate possibilities and apply threshold criteria

Step 4:
Determine final end-class selection
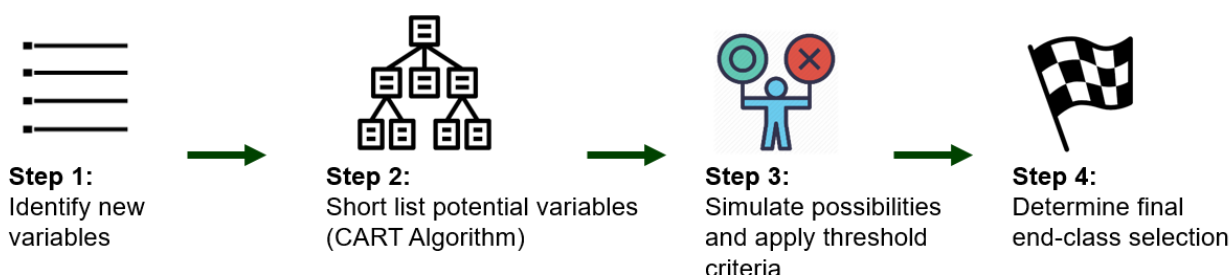
Step three of this process involved seven decision criteria set out in Table 7. Further details about the other steps and the statistical approach, including the Classification and Regression Tree Algorithm, are at **Appendix C.**

Table 7. Decision criteria for split threshold simulations

	Criteria	Optimum Threshold	Principle
1	Minimum episodes per category of 200 per year	✓	Robust episode volume and total aggregated cost per end class for stability
2	Minimum cost per category of $1m per year	✓	
3	Minimum percentage per category of 10% per year	✓	
4	Minimum absolute change in mean cost of $2,000 between consecutive categories	Either Criteria 4 or Criteria 5	Significant difference in average cost between end-classes
5	Minimum relative change in mean cost of 1.5 (or 1.5^{-1}) between consecutive categories		
6	Maximum coefficient of variation (CoV)[4] of 1.5	✓	Satisfactory homogeneity of each end-class
7	Number of splits determined by the subsequent increase in RID. The minimum increase in RID must be greater than 1% to warrant an extra split.	✓	Significant RID improvement (i.e. 1%) to warrant an increase in the number of end classes.

3.6.2 Patient frailty

Frailty is a decline in multiple physiological systems that makes a person more vulnerable to poor outcomes from minor stressor events.[5] Early in the project to develop AN-SNAP V5, clinicians noted that:

- subacute care has an increasing proportion of patients with frailty

- frail patients are complex, which was likely to be a significant cost driver

- the current classification variables do not capture this frailty-related complexity well.

Notwithstanding considerable interest across all Australian jurisdictions, clinicians acknowledge that frailty is difficult to conceptualise and measure consistently.[6] Further, and most importantly

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4 A Coefficient of Variation (CoV) is the standard deviation of a set of numbers divided by their mean, which provides a measure of variability relative to the values that are 'typical' in the dataset. Generally, the lower the CV, the more homogeneous the class.

5 Adapted from Clegg A, Young J, Iliffe S, Rikkert M, Rockwood, K. (2013) *Frailty in elderly people*, Lancet; 381: 752-62.

6 See for example: Theo O, Brothers TD, Mitnitski A, Rockwood, K. (2013) *Operationalization of frailty using eight commonly used scales and comparison of their ability to predict all-cause mortality*. Journal of American Geriatric Society; 61: 1537-51

for this project, there is no clinical frailty tool currently reported in the Australian admitted care national data sets.

This meant that, despite clear support for patient frailty being recognised in the subacute ABF system, there was no prospect of IHPA integrating a clinical frailty tool as a variable for AN-SNAP V5. IHPA searched for other ways of incorporating the concept into the classification, with a particular focus on approaches that could use data already collected as a proxy for frailty.

Consultation spotlight #1

As part of the public consultation for AN-SNAP V5, IHPA asked stakeholders if they preferred any particular prospective clinical frailty instrument being prioritised for future consideration for ABF purposes. The submissions showed an almost consensus of support for the Rockwood Clinical Frailty Scale[7] as a prospective national measure for assessing patient frailty in subacute admitted settings. The main reasons cited were that Rockwood:

- is captured at the beginning of the episode so it can support care planning

- has demonstrated clinical relevance and can be used for clinical management purposes, such as planning length of stay and care goals

- has a broad range of possible applications so could be used for multiple care types

- can be administered quickly (around five minutes).

IHPA's response

As a result of this feedback IHPA will investigate the feasibility and usefulness of introducing the Rockwood Clinical Frailty Scale[6] as a data element in the Admitted Subacute and Non-Acute Hospital Care National Best Endeavours Data Set commencing 1 July 2023. This will enable IHPA to collect data to inform the on-going refinement of the classification.

3.6.2.1   A Hospital Frailty Risk Score

Following a literature search, IHPA proposed adapting a method that had been reported in a 2018 study by Gilbert and colleagues: *Development and validation of a Hospital Frailty Risk Score focusing on older people in acute care settings using electronic hospital records: an observational study* (**frailty study**).[8]

The frailty study developed and validated a proxy approach of using International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) codes as proxy markers of frailty by:

- using cluster analysis to identify a distinct group of patients admitted to hospital with characteristics of frailty that could be identified on the basis of ICD-10 codes and resource use

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[7] See Rockwood K, Song X, MacKnight C, Bergman H, HoganD B, McDowell I, and Mitinitski A. (2005). A global clinical measure of fitness and frailty in elderly people. CMAJ: *Canadian Medical Association Journal = journal de l'Association medicale canadienne*, 173(5), 489-495.

[8] Gilbert T, Neuburger J, Kraindler J, et al, (2018) *Development and validation of a Hospital Frailty Risk Score focusing on older people in acute care settings using electronic hospital records: an observational study*. Lancet; 391: 1775 - 82

- creating a Hospital Frailty Risk Score using ICD-10 codes that were overrepresented in that group

- demonstrating that the Hospital Frailty Risk Score predicted adverse outcomes after emergency admission; and had fair to moderate agreement with other frailty scores (which reflects the 'normal' sort of agreement between frailty measures).

3.6.2.2 Adapting the Hospital Frailty Risk Score to the Australian activity based funding context

IHPA needed to adapt the Hospital Frailty Risk Score to make it fit-for-purpose as part of an ABF classification in Australia.

First, the ICD-10 codes identified in the Hospital Frailty Risk Score were mapped to the Australian Modification (ICD-10-AM). These 109 ICD-10-AM codes were then reviewed to identify and exclude:

- codes considered to provide additional or supplementary information to another code already assigned

- codes describing an ill-defined and/or transient condition of symptoms

- codes providing context rather than information critical to the clinical description of an episode of care.

This process (the Exclusion Review), used guiding principles established for other admitted care classifications[9]. The intent is to align methodologies used on other classifications and identify where codes may be ill-defined or effectively duplicating other coded information.

The ICD-10-AM codes remaining after the Exclusion Review are the basis of IHPA's proposed immediately implementable, low cost recognition of frailty: the Frailty Related Index of Comorbidities (FRIC) (Table 8).

For the FRIC to be useful in an ABF context it had to predict costs. IHPA tested this by applying it as a variable for the rehabilitation, psychogeriatric, GEM and non-acute care types using the three years of national activity and cost data (2015–16 to 2017–18). The analysis demonstrated a considerable improvement in the explanatory power of the classification for all of the care types, when compared to the existing variables in AN-SNAP V4.

Further details about the FRIC and the Exclusion Review are at **Appendix D**.

Table 8. ICD-10-AM codes used to calculate the Frailty Related Index of Comorbidities

ICD-10-AM three character code	Code block description	Codes excluded from the three character code stem	Code score for Frailty Related Index of Comorbidities
A04*	Other bacterial intestinal infection	Nil	1.1
A09*	Other gastroenteritis and colitis of infectious origin	Nil	1.1
A41*	Other sepsis	Nil	1.6
D64*	Other anaemias	Nil	0.4
E05*	Thyrotoxicosis [hyperthyroidism]	Nil	0.9

[9] Independent Hospital Pricing Authority (2019) *Australian Refined Diagnosis Related Groups Version 10.0 Final Report.*

ICD-10-AM three character code	Code block description	Codes excluded from the three character code stem	Code score for Frailty Related Index of Comorbidities
E16*	Other disorders of pancreatic internal secretion	E16.2	1.4
E53*	Deficiency of other B group vitamins	Nil	1.9
E55*	Vitamin D deficiency	E55.9	1.0
E86	Volume depletion	Nil	2.3
F00*	Dementia in Alzheimer's disease	Nil	7.1
F01*	Vascular dementia	Nil	2.0
F03	Unspecified dementia	Nil	2.1
F05*	Delirium, not induced by alcohol and other psychoactive substances	Nil	3.2
F10*	Mental and behavioural disorders due to use of alcohol	F10.9	0.7
F32*	Depressive episode	Nil	0.5
G20	Parkinson's disease	Nil	1.8
G30*	Alzheimer's disease	Conditional exclusion[1]	4.0
G31*	Other degenerative diseases of nervous system, not elsewhere classified	Nil	1.2
G40*	Epilepsy	Nil	1.5
G45*	Transient cerebral ischaemic attacks and related syndromes	Nil	1.2
G81*	Hemiplegia	Nil	4.4
H54*	Visual impairment including binocular or monocular blindness	H54.3, H54.9	1.9
H91*	Other hearing loss	Nil	0.9
I63*	Cerebral Infarction	Nil	0.9
I67*	Other cerebrovascular diseases	I67.9	2.6
I95*	Hypotension	Nil	1.6
J18*	Pneumonia, organism unspecified	Nil	1.1
J22	Unspecified acute lower respiratory infection	Nil	0.7
J69*	Pneumonitis due to solids and liquids	Nil	1.0
J96*	Respiratory failure, not elsewhere classified	Nil	1.5
K26*	Duodenal ulcer	K26.9	1.6
K52*	Other noninfective gastroenteritis and colitis	Nil	0.3
K59*	Other functional intestinal disorders	K59.0, K59.1, K59.4, K59.9	1.8
K92*	Other diseases of digestive system	K92.9	0.8
L03*	Cellulitis	L03.19, L03.9	2.0
L08*	Other local infections of skin and subcutaneous tissue	L08.1, L08.8, L08.9	0.4
L89*	Pressure injury	Nil	1.7
L97*	Ulcer of lower limb, not elsewhere classified	Nil	1.6
M15*	Polyarthrosis	M15.9	0.4
M19*	Other arthrosis	M19.09, M19.19, M19.29, M19.89, M19.9*	1.5
M25*	Other joint disorders, not elsewhere classified	M25.09, M25.19, M25.29, M25.39, M25.49, M25.5*, M25.6*, M25.79, M25.89, M25.9*	2.3

ICD-10-AM three character code	Code block description	Codes excluded from the three character code stem	Code score for Frailty Related Index of Comorbidities
M41*	Scoliosis	M41.09, M41.19, M41.29, M41.39, M41.49, M41.59, M41.99	0.9
M48*	Other spondylopathies	M48.09, M48.19, M48.29, M48.39, M48.49, M48.59, M48.89, M48.99.	0.5
M79*	Other soft tissue disorders, not elsewhere classified	M79.0*, M79.1*, M79.29, M79.3*, M79.49, M79.59, M79.6*, M79.79, M79.86, M79.89, M79.9*	1.1
M80*	Osteoporosis with pathological fracture	M80.09, M80.19, M80.29, M80.39, M80.49, M80.59, M80.99	0.8
M81*	Osteoporosis without pathological fracture	M81.19, M81.49, M81.59, M81.69, M81.89, M81.99	1.4
N17*	Acute kidney failure	Nil	1.8
N18*	Chronic kidney disease	N18.1, N18.2, N18.3	1.4
N20*	Calculus of kidney and ureter	Nil	0.7
N28*	Other disorders of kidney and ureter, not elsewhere classified	N28.1, N28.9	1.3
N39*	Other disorders of urinary system	N39.9	3.2
R00.3	Abnormalities of heart beat	NA	0.7
R02	Gangrene, not elsewhere classified	Nil	1.0
R32	Unspecified urinary incontinence	Nil	1.2
R40.2	Somnolence, stupor and coma	N/A	2.5
R56*	Convulsions, not elsewhere classified	Nil	2.6
S01*	Open wound of head	Nil	1.1
S06*	Intracranial injury	S06.00	2.4
S09*	Other and unspecified injuries of head	Nil	1.2
S22*	Fracture of rib(s), sternum and thoracic spine	Nil	1.8
S32*	Fracture of lumbar spine and pelvis	Nil	1.4
S42*	Fracture of shoulder and upper arm	Nil	2.3
S51*	Open wound of forearm	Nil	0.5
S72*	Fracture of femur	Nil	1.4
T83*	Complications of genitourinary prosthetic devices, implants and grafts	Nil	2.4
Z06.51	Resistance to antimicrobial drugs	N/A	0.8

Notes:

* means to include all the three, four and five character codes that fall within that character stem, unless they have been excluded.

[1] Four diagnosis codes are excluded conditionally depending on other diagnoses assigned in the episode. Conditional exclusions have been identified for particular aetiology (dagger) and manifestation (asterisk) pairs of codes in scope for the FRIC. In these cases, the aetiology code is excluded from being assigned a FRIC score whenever the manifestation code is present as per the following Conditional Exclusion Table.

Conditional Exclusion Table

Excluded Aetiology Codes		Conditional Manifestation Codes	
G30.0	Alzheimer's disease with early onset	F00.0	Early dementia in Alzheimer's disease
G30.1	Alzheimer's disease with late onset	F00.1	Late dementia in Alzheimer's disease
G30.8	Other Alzheimer's disease	F00.2	Alzheimer's dementia atypical or mixed type
G30.9	Alzheimer's disease unspecified	F00.9	Alzheimer's dementia unspecified

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Consultation spotlight #2

During the AN-SNAP V5 development, some stakeholders expressed concerns that the FRIC could not be considered a valid proxy of clinical frailty because of:

- the way it has been adapted, particularly the Exclusion Review (see **Appendix D**)

- the differences between the setting and population it was validated for and how it was going to be applied in AN-SNAP V5 for GEM and non-acute care classification.

IHPA's response

IHPA is not proposing the FRIC to be a clinically valid measure of frailty. Rather, it is statistically useful group of diagnostic codes that are a) aligned/related to frailty and b) explain variation in GEM and non-acute care costs better than the AN-SNAP V4 approach.

In relation to the Exclusion Review, IHPA agrees that some of the codes that have been removed diminish the 'face validity' of the score as a measure of frailty. However, it is IHPA's view that it has an overriding responsibility to ensure confidence in, and reliability of, the components of the ABF funding system. This includes proactively identifying where codes may be ill-defined or effectively duplicating other coded information, as well as risk managing where a classification may be vulnerable to the recording of additional codes to increase the complexity of a given episode of care.

IHPA also acknowledges that if the FRIC is calculated with all of the original Hospital Frailty Risk Score codes included it does perform slightly better statistically than the score with the codes excluded. However, the difference is marginal; and there is still a significant improvement to AN-SNAP V4 post the Exclusion Review as per below.

Care Type	Number of episodes	AN-SNAP V4		AN-SNAP V5 – FRIC pre exclusion		AN-SNAP V5 – FRIC post exclusion	
		Classes	RID	Classes	RID	Classes	RID
GEM (overnight only)	82,085	6	4.9%	6	8.7%	6	7.6%
Non-acute (overnight only, excludes long-term class)	52,202	5	1.2%	4	3.7%	4	3.5%

IHPA also agrees that there are notable differences between the way that Gilbert and colleagues had validated their Hospital Frailty Risk Score and the intended use of the FRIC.

IHPA acknowledges that these differences may impact whether the FRIC has construct or content validity with clinical frailty. However, ultimately it is being proposed as a resource predictor, rather than a clinical predictor.

> **Consultation spotlight #3**
>
> Some stakeholders did not support the FRIC being adopted for the classification because of its retrospective approach (that is, it can only be calculated at the end of an episode of care based on ICD-10-AM diagnosis codes). The argument being that a retrospective variable is inconsistent with AN-SNAP as a clinically useful casemix classification with (mainly) prospective instruments.
>
> IHPA's response
>
> IHPA acknowledges that it would be ideal if the subacute care classification recognised frailty using a prospective clinical tool that could both 'inform and direct care and outcomes' and perform the necessary ABF functions.
>
> However, with no frailty measure currently collected as part of the admitted patient national datasets, it will take about three to five years to recognise frailty this way in the classification.
>
> IHPA's view is that a three to five year delay to recognise an agreed cost driver in an ABF classification is not reasonable when there is a feasible and effective alternative approach that can be adopted immediately.

Patient comorbidities have been repeatedly identified as cost drivers across a range of subacute care types.[10] During the early stage of the AN-SNAP V5 development, stakeholders supported IHPA investigating the possibility of accounting for comorbidities in the next version of the classification.

IHPA investigated the impact of several comorbidities on the statistical performance of the classification for rehabilitation, palliative care, psychogeriatric, GEM and non-acute care types.

Two approaches were used: binary analysis (whether the comorbidity was present or not) and index analysis (grouping of selected comorbidities with weightings associated for each of them).

To select the comorbidities for binary analysis, IHPA relied on:

- comorbidities that were most prevalent in the national activity data and/or had high average cost (examples include depression, malnutrition and social factors)
- specific proposals from stakeholders about clinically significant diagnoses (examples include level of spinal cord injury and prosthesis location in the body).

The index analysis investigated the Charlson Comorbidity Index (CCI) and the FRIC (as described at 3.6.2).

The CCI is an internationally validated approach to measuring disease burden by quantifying the effect of comorbid illnesses on patient outcomes.[11] It includes a range of comorbid conditions including heart, liver, kidney and vascular disease, cancer, diabetes and dementia.

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[10] See for example, Green J, Gordon R, Blanchard M, Kobel C and Eager K. (2015), *Development of AN-SNAP Version 4: Final Report*, Centre for Health Service Development, University of Wollongong.

[11] The Charlson Comorbidity Index (CCI) has been validated on Australian population based hospital data. See Sundararajan V, Henderson T, Perry C, Muggivan A, Quan H, Ghali W. (2004), New ICD-10 version of the Charlson Comorbidity Index predicted in-hospital mortality, Journal of Clinical Epidemiology, 57, 1288 – 1294.

IHPA tested the CCI as a potential variable for the stroke, brain dysfunction, amputation of limbs, orthopaedic fractures, major multiple trauma and reconditioning rehabilitation impairment types, as well as the other subacute care types (palliative care, GEM, psychogeriatric) and the non-acute care type.

Ultimately, the statistical analysis supported the FRIC being adopted for AN-SNAP V5 as an effective predictor of resource use. The CCI did not progress, as it was outperformed by both the existing AN-SNAP V4 variables and the FRIC.

4. The AN-SNAP V5 classification

4.1   Overview

The Australian National Subacute and Non-Acute Patient Classification (AN-SNAP) Version 5.0 (V5) is a modest refinement of AN-SNAP Version 4.0 (V4).

Table 9 summarises the key similarities and differences between AN-SNAP V4 and AN-SNAP V5.

Table 9. Comparing AN-SNAP V4 and AN-SNAP V5

Feature	Summary of AN-SNAP V5 changes from AN-SNAP V4
Overarching branches	
Two overarching branches Admitted patient episodes (both overnight and same-day) and non-admitted episodes (outpatients and community)[12]	No change
Care types	
Five care types Rehabilitation, palliative care, geriatric evaluation and management (GEM), psychogeriatric, non-acute	No change
Rehabilitation care type	
Four variables Impairment type, Functional Impairment Measure™ (FIM™) Motor score – weighted (WFIM™), FIM™ Cognition score, age	No change
Within care type splits	New impairment type group created: Joint replacement activity removed from the *Orthopaedic conditions, all others* group to create a new group – *Orthopaedic conditions, replacement (knee, hip, shoulder)* Revised the set of WFIM™ Motor impairment-specific weights Change the splitting variables, the order of splitting variables, or the composition of groups, for seven impairment types Change the thresholds used for splitting variables (WFIM™ Motor score thresholds; FIM™ Cognition thresholds; Age thresholds)

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[12] The non-admitted branch of AN-SNAP V4 is not used by IHPA for Activity Based Funding and was out of the scope of the project - no changes have been made.

Feature	Summary of AN-SNAP V5 changes from AN-SNAP V4
Palliative care type	
Three variables Palliative care phase, Resource Utilisation Groups – Activities of Daily Living (RUG-ADL) total score, age	No changes proposed
Within care type splits	No changes proposed
Geriatric evaluation and management care type	
Two variables FIM™ Motor score, Dementia and/or delirium flag (ICD-10-AM diagnosis)	Frailty Related Index of Comorbidities (FRIC) introduced calculated using ICD-10-AM codes as proxy markers of frailty (including dementia and delirium codes) Dementia and/or delirium flag (ICD-10-AM diagnosis) removed
Within care type splits	Change the order of splitting variables - Frailty Related Index of Comorbidities (FRIC) to be applied first followed by the FIM™ Motor score Change the thresholds used for splitting variable (FIM™ Motor score thresholds)
Psychogeriatric care type	
Two variables Length of stay - Long term care > 91 days, Health of the Nation Outcome Scale 65+ (HoNOS 65+) - Overactive Behaviour, Activities of Daily Living and Total Score	HoNOS 65+ (Overactive Behaviour, Activities of Daily Living and total score) replaced with HoNOS 65+ total score only
Within care type splits	Within care split changes as a result of adopting HoNOS 65+ total score in place of HoNOS 65+ sub scores
Non-acute care type	
Three variables Length of stay - Long term care > 91 days, Age, RUG-ADL	RUG-ADL removed Frailty Related Index of Comorbidities (FRIC) introduced (for Age group ≥ 65 years only) calculated using ICD-10-AM codes as proxy markers of frailty
Within care type splits	Change the thresholds used for splitting variable - Age thresholds splitting the Short Term Care group (Length of Stay ≤ 91 days)

4.1.1 Admitted and non-admitted care

AN-SNAP V5 retains the overarching separation of admitted (both same-day and overnight) and non-admitted care.

As noted previously, the non-admitted branch of AN-SNAP V4 is not used for activity based funding (ABF) and was out of scope of the review.

4.1.2 Five care types

AN-SNAP V5 also continues to classify care into five types: rehabilitation, palliative care, GEM, psychogeriatric care, and non-acute (sometimes referred to as maintenance) care. There are no changes to the definitions of each of these care types (detailed at **Appendix E**).

AN-SNAP V5 also maintains the convention established in V4 to order the five care types consistent with the numeric care type codes assigned in the Admitted Patient Care National Minimum Data Set (APC NMDS).[13]

4.1.3 Functional Independence Measure Motor weights

Functional impairment is a prominent cost driver for rehabilitation care; and all AN-SNAP versions have used the Functional Independence Measure (FIM™) instrument as the measure of patient function for the rehabilitation and GEM care types. The FIM™ consists of 18 items divided into two major groups: Motor (items 1-13) and Cognitive (items 14 – 18). Each item is assessed using a seven point scale ranging from '1' for total assistance required to '7' for complete independence.

AN-SNAP V4 changed the way that FIM™ Motor scores were applied in the classification by introducing a weighting methodology. Each of the thirteen FIM Motor assessment items was assigned a weighted depending on the variable impact of each item's score on the cost for caring for different types of rehabilitation patients. Ultimately, the weighted FIM™ was adopted for AN-SNAP V4 based on clear evidence that it improved the statistical performance of the classification and the resource homogeneity within the end classes.[14]

AN-SNAP V5 continues to use weighted FIM™ Motor scores. However, with a much greater volume and coverage of data available, IHPA was able to update all the weightings (and introduce a weighting for the Major Multiple Trauma impairment type which was effectively unweighted in AN-SNAP V4) to make further improvements in how well the classification explains variation in costs.

The updated impairment-specific FIM™ item weights for admitted adult rehabilitation overnight classes are detailed at **Appendix F**.

As was noted for AN-SNAP V4, clinicians will still collect and use FIM™ according to the established protocols. The weighted FIM™ Motor score is calculated automatically in the software that groups episodes to the respective classes, so the weightings have no impact on day-to-day clinical practice.

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[13] See Australian Institute of Health and Welfare, **Metadata Online Data Registry (MeTeOR) identifier 711010**

[14] See Green J, Gordon R, Blanchard M, Kobel C and Eager K. (2015), *Development of AN-SNAP Version 4: Final Report*, Centre for Health Service Development, University of Wollongong.

4.2 The AN-SNAP V5 admitted classes

AN-SNAP V5 has 97 end classes for admitted care:

- 83 overnight classes across all five care types

- six same-day classes – one for each of adult rehabilitation, paediatric rehabilitation, adult palliative care, paediatric palliative care, GEM, and psychogeriatric care

- eight ungroupable error classes – seven ungroupable error classes for each care type and one ungroupable error class where valid care type and/or episode type codes are missing.

Figure 2. AN-SNAP Version 5.0 Classification Structure - Summary
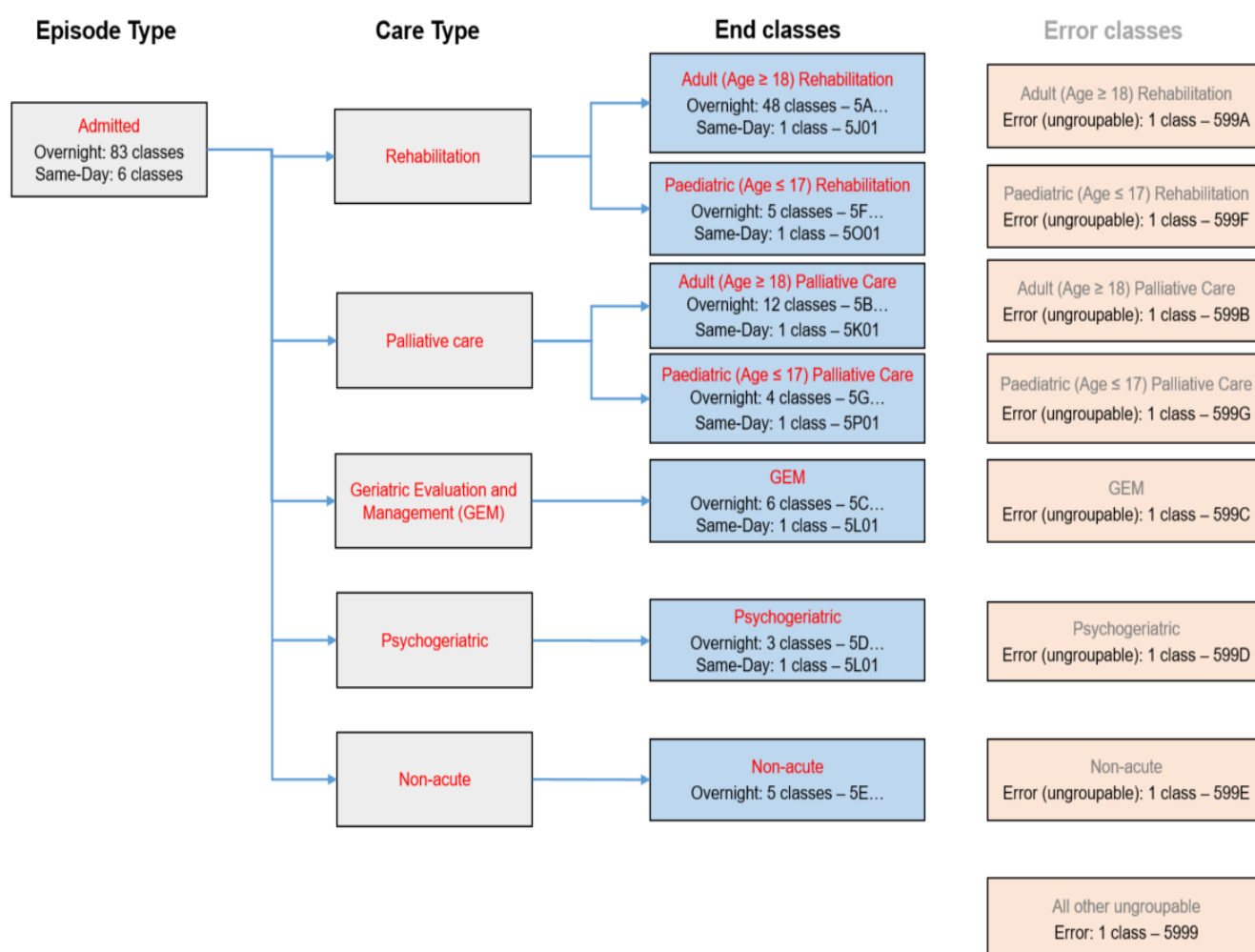
A complete table of the AN-SNAP V5 classification admitted end classes including variables, thresholds and key characteristics of the classes is at **Appendix G**.

4.2.1 Admitted adult rehabilitation classes

The admitted adult rehabilitation branch of AN-SNAP V5 consists of one same-day class and 48 overnight classes as shown in Figure 3.

Figure 3. Adult rehabilitation structure
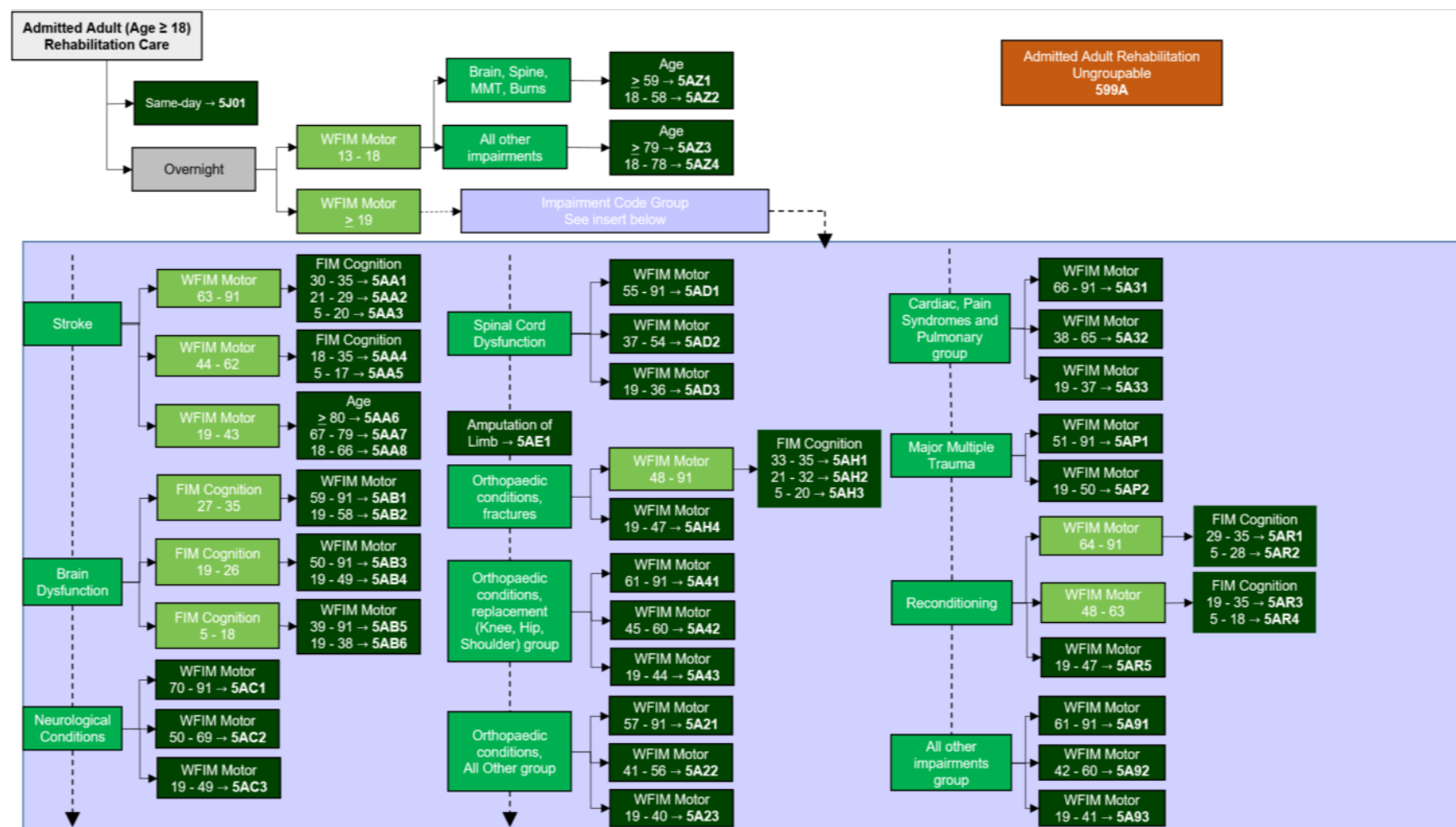
4.2.1.1 Same-day class

The AN-SNAP V5 same-day class for admitted adult rehabilitation care (Table 10) is identical to the same-day class for **V4**.

Table 10. Adult rehabilitation - Same-day class

End class for V5	Description and thresholds for V5	Episodes	Average cost	Average length of stay	CoV
Rehabilitation care					
5J01	Adult same-day rehabilitation	78,289	$545	1.00	0.79

This absence of change reflects:

- the continuing clear difference in the average episode cost between same-day and overnight episodes; and

- insufficient data to investigate splitting the same day class because very few same day episodes (less than 10 per cent) had a completed FIM^{TM} Motor score.

Notably, there was considerable variation in the number of same-day rehabilitation episodes across jurisdictions, which IHPA and clinicians agreed was most likely a reflection of different admission practices.

4.2.1.2 Overnight higher complexity (WFIM^{TM} Motor score 13 - 18) classes

AN-SNAP V5 has four higher complexity (low WFIM^{TM} Motor score 13 - 18) classes, as detailed in Table 11 (cf. four classes in **V4**).

Table 11. Higher complexity classes (low WFIM^{TM} Motor score 13 - 18)

End class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	CoV
Rehabilitation care							
Low WFIM^{TM} – Brain, spine, major multiple trauma (MMT), burns							
5AZ1	WFIM Motor score 13-18	Brain, spine, MMT, burns	Age >= 59	656	$47,679	37.39	1.11
5AZ2	WFIM Motor score 13-18	Brain, spine, MMT, burns	Age 18 - 58	664	$71,380	50.40	1.12
Low WFIM^{TM} – All other impairment types							
5AZ3	WFIM Motor score 13-18	All other impairments	Age >= 79	3,682	$24,205	22.36	0.92
5AZ4	WFIM Motor score 13-18	All other impairments	Age 18 - 78	3,788	$35,742	31.09	1.06

Low WFIM^{TM} Motor score

AN-SNAP V5, like V4, uses a WFIM^{TM} Motor score as the first split in the Admitted Adult Rehabilitation Overnight branch. Two groups are created: a low functioning group (high complexity) with WFIM^{TM} Motor scores of 13 to 18; and a higher functioning group (lower complexity) with WFIM^{TM} Motor scores greater than or equal to 19.

The main reason for this first split is to separate out the very high resource intensive episodes with the lowest WFIM^{TM} Motor score regardless of the impairment type. IHPA tested whether the FIM^{TM} Motor threshold could be updated to optimise this objective. While the analysis did show that changing the threshold (to a score of 22) would optimise the statistical performance of this split, the clinical advice was to retain the threshold at a score of 18 so that this group continued to represent patients with the greatest functional impairment. On the basis of the clinical advice,

and the existing threshold providing sufficient sensitivity to average cost, AN-SNAP V5 keeps the threshold as it was for AN-SNAP V4.

Impairment type groups

The next split in the admitted adult rehabilitation overnight higher complexity branch uses groups derived from the patient's primary impairment for the rehabilitation episode, as defined according to the Australasian Rehabilitation Outcomes Centre (AROC) impairment code set.[15]

In AN-SNAP V4, the very low WFIM™ Motor episodes are split into two impairment type groups according to average cost. Group 1 was the highest cost impairment types (Brain dysfunction, Spinal cord dysfunction, and Major Multiple Trauma); and Group 2 consisted of the lower cost (but still relatively high complexity) impairment types.

IHPA tested the composition of these two groups by considering the average costs using the AN-SNAP V5 data set.

As Table 12 shows, the two groups continue to demonstrate reasonable difference except for Burns episodes, which were in Group 2 but had a very high average cost (albeit across a low volume of episodes).

Table 12. High complexity episodes (low WFIM™ Motor score) - Impairment type cost profile

AN-SNAP V4 Grouping	Impairment type	Av. age	Episode volume	Average cost	Standard deviation
Low WFIM™ (high complexity) Group 1	Spinal Cord Dysfunction	58	283	$ 68,009	$ 68,500
	MMT	44	103	$ 65,715	$ 58,999
	Brain Dysfunction	56	631	$ 49,859	$ 60,905
Low WFIM™ (high complexity) Group 2	Burns	53	6	$ 154,324	$ 116,686
	Developmental Disability	51	5	$ 38,513	$ 27,358
	Stroke	74	2,555	$ 37,522	$ 34,319
	Neurological Conditions	61	432	$ 31,863	$ 36,311
	Other Disabling Impairments	66	59	$ 28,496	$ 26,664
	Amputation of Limb	69	60	$ 27,986	$ 27,107
	Reconditioning	76	1,247	$ 20,710	$ 19,992
	Arthritis	73	10	$ 20,072	$ 16,880
	Ortho Conditions - Other	79	34	$ 20,038	$ 17,255
	Ortho Conditions - Fractures	82	1,044	$ 19,771	$ 16,568
	Congenital Deformity	73	11	$ 18,554	$ 18,798
	Cardiac	74	78	$ 18,293	$ 16,269
	Pulmonary	75	90	$ 18,037	$ 19,700
	Ortho Conditions - Replacement	77	170	$ 17,930	$ 17,820
	Pain Symptoms	73	62	$ 17,413	$ 16,749

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[15] Australian Institute of Health and Welfare, **Metadata Online Data Registry (MeTeOR) identifier 498498**; see also Australasian Rehabilitation Outcomes Centre (2013) **AROC Impairment Coding Guidelines**

While noting the low episode volume and high cost deviation, the clinicians in the rehabilitation clinical subgroup agreed that it was appropriate for the very low WFIM™ Motor Burns episodes to be moved from the lower average cost Group 2 to the high-cost Group 1.

4.2.1.3   Overnight lower complexity (WFIM™ Motor score ≥ 19) classes

The lower complexity admitted adult rehabilitation overnight episodes (with a WFIM™ Motor score ≥ 19) are then split according to impairment types as described below.

Stroke impairment

There are eight 'Stroke' classes in AN-SNAP V5 as set out in Table 13 (cf. seven classes in **V4**).

Table 13. Adult rehabilitation - Stroke impairment classes

End class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	CoV
Rehabilitation care							
Stroke							
5AA1	Stroke	WFIM Motor 63 - 91	FIM Cognition 30 - 35	3,025	$11,100	10.65	0.78
5AA2	Stroke	WFIM Motor 63 - 91	FIM Cognition 21 - 29	2,464	$14,999	13.96	0.79
5AA3	Stroke	WFIM Motor 63 - 91	FIM Cognition 5 - 20	1,015	$22,258	19.93	0.77
5AA4	Stroke	WFIM Motor 44 - 62	FIM Cognition 18 - 35	4,818	$19,000	17.75	0.76
5AA5	Stroke	WFIM Motor 44 - 62	FIM Cognition 5 - 17	1,252	$26,865	25.22	0.75
5AA6	Stroke	WFIM Motor 19 - 43	Age >= 80	2,616	$28,022	26.59	0.75
5AA7	Stroke	WFIM Motor 19 - 43	Age 67 - 79	2,331	$34,177	30.78	0.80
5AA8	Stroke	WFIM Motor 19 - 43	Age 18 - 66	1,641	$44,989	38.35	0.86

Brain dysfunction

There are six 'Brain dysfunction' classes in AN-SNAP V5 as set out in Table 14 (cf. seven classes in **V4**).

Table 14. Adult rehabilitation - Brain dysfunction classes

End class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	CoV
Rehabilitation care							
Brain dysfunction							
5AB1	Brain dysfunction	FIM Cognition 27 - 35	WFIM Motor 59 - 91	1,398	$13,731	12.05	0.97
5AB2	Brain dysfunction	FIM Cognition 27 - 35	WFIM Motor 19 - 58	704	$20,923	18.12	0.95
5AB3	Brain dysfunction	FIM Cognition 19 - 26	WFIM Motor 50 - 91	1,395	$19,370	16.18	0.90
5AB4	Brain dysfunction	FIM Cognition 19 - 26	WFIM Motor 19 - 49	605	$28,280	23.82	1.03
5AB5	Brain dysfunction	FIM Cognition 5 - 18	WFIM Motor 39 - 91	1,126	$31,740	25.42	1.00
5AB6	Brain dysfunction	FIM Cognition 5 - 18	WFIM Motor 19 - 38	624	$39,528	32.54	1.21

AN-SNAP V5 switches the order that the FIM™ sub-scores (WFIM™ Motor and FIM™ Cognition) are applied as splitting variables for the brain dysfunction impairment type. That is, in V5, brain

dysfunction episodes are first grouped by FIM^{TM} Cognition scores and then by WFIM^{TM} Motor scores.

Changing the order that the FIM^{TM} sub scores are applied was a clinician led proposal first suggested by the AN-SNAP V5 development rehabilitation clinical subgroup. The final recommendation for the AN-SNAP V5 brain dysfunction structure reflected:

- the Classification And Regression Tree (CART) model selecting FIM^{TM} cognition as a better explanatory variable than FIM^{TM} motor at predicting cost

- detailed statistical analysis demonstrating reduction in deviance (RID) of 15.1 per cent, a considerable improvement from the AN-SNAP V4 baseline of 13.1 per cent

- the reduced number of end-classes demonstrating appropriate stability, homogeneity and difference in average cost.

Notably, the SCWG endorsed the final brain dysfunction structure as a minor exception to the decision criteria ordinarily applied for split thresholds for the project (see Table 7). Specifically, the sixth 'high complexity' class (grouped by FIM^{TM} Cognition score 5 - 18 and then weighted FIM^{TM} Motor score 19 - 38) was accepted as part of the structure. This was despite the split of the FIM cognition 5 - 18 group only improving RID performance by 0.4 per cent, which was less than the minimum improvement threshold of 1 per cent that was applied (in most cases) during the development of AN-SNAP V5. The reason for this exception was agreement that the brain dysfunction structure should include a class which differentiated very complex cases with typically long Length of Stay (LoS).

Neurological conditions

There are three 'Neurological condition' classes in AN-SNAP V5 as set out in Table 15 (cf. three classes in **V4**).

Table 15. Adult rehabilitation - Neurological condition classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Rehabilitation care						
Neurological conditions						
5AC1	Neurological conditions	WFIM Motor 70 - 91	1,476	$11,977	11.74	0.76
5AC2	Neurological conditions	WFIM Motor 50 - 69	2,643	$16,346	16.26	0.80
5AC3	Neurological conditions	WFIM Motor 19 - 49	2,601	$24,673	23.85	0.91

The only changes in AN-SNAP V5 for these classes is the update of the FIM^{TM} Motor weights and a statistically driven update of the threshold scores to improve the performance of the branch.

Spinal cord dysfunction

There are three 'Spinal cord dysfunction' classes in AN-SNAP V5 as set out in Table 16 (cf. three classes in **V4**).

Table 16. Adult rehabilitation - Spinal cord dysfunction classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Rehabilitation care						
Spinal cord dysfunction						
5AD1	Spinal cord dysfunction	WFIM Motor 55 - 91	826	$25,669	21.69	1.13
5AD2	Spinal cord dysfunction	WFIM Motor 37 - 54	649	$39,101	32.79	0.97
5AD3	Spinal cord dysfunction	WFIM Motor 19 - 36	934	$55,288	42.60	0.99

AN-SNAP V5 changes this branch by removing the age variable due to poor statistical performance - the split using just the single variable providing a small improvement in RID.

Amputation of limb

There is one 'Amputation of limb' class in AN-SNAP V5 as set out in Table 17 (cf. four classes in **V4**).

Table 17. Adult rehabilitation - Amputation of limb class

End class for V5	Description and thresholds for V5	Episodes	Average cost	Average length of stay	CoV
Rehabilitation care					
Amputation of limb					
5AE1	Amputation of limb	3,915	$23,467	22.15	0.93

In AN-SNAP V5, the 'Amputation of limb' episodes are no longer split using age and WFIM™. This is because the analysis showed that using these variables provided only marginal statistical improvement compared to a single class (that is, no splitting scenario achieved the minimum performance improvement of 1 per cent RID).

Orthopaedic conditions, fractures

There are four 'Orthopaedic conditions, fractures' classes in AN-SNAP V5 as set out in Table 18 (cf. four classes in **V4**).

Table 18. Adult rehabilitation - Orthopaedic conditions, fractures classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Rehabilitation care						
Orthopaedic conditions, fractures						
5AH1	Orthopaedic conditions, fractures	WFIM Motor 48 - 91	FIM Cognition 33 - 35	7,381	$12,439	12.85	0.82
5AH2	Orthopaedic conditions, fractures	WFIM Motor 48 - 91	FIM Cognition 21 - 32	7,515	$14,564	15.61	0.68
5AH3	Orthopaedic conditions, fractures	WFIM Motor 48 - 91	FIM Cognition 5 - 20	2,725	$18,260	20.50	0.66
5AH4	Orthopaedic conditions, fractures	weighted FIM Motor 19 - 47		13,589	$19,796	20.20	0.77

Orthopaedic conditions, replacements (knee, hip, shoulder) group

A new impairment type group is being introduced in AN-SNAP V5 to provide three classes to classify knee, hip and shoulder replacement activity as set out in Table 19.

Table 19. Adult rehabilitation - Orthopaedic conditions, replacement classes (new group)

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Rehabilitation care						
Orthopaedic conditions, replacement (knee, hip, shoulder) group						
5A41	Orthopaedic conditions, replacement (knee, hip, shoulder)	WFIM Motor 61 - 91	7,680	$8,469	9.41	0.67
5A42	Orthopaedic conditions, replacement (knee, hip, shoulder)	WFIM Motor 45 - 60	5,486	$10,924	11.78	0.69
5A43	Orthopaedic conditions, replacement (knee, hip, shoulder)	WFIM Motor 19 - 44	2,381	$15,562	16.33	0.79

Establishing the new 'Orthopaedic conditions, replacement' impairment type group was a clinician led proposal. The group was created by removing knee, hip and shoulder joint replacement activity from its AN-SNAP V4 grouping in 'Orthopaedic conditions, all others' using AROC codes[16] to define two impairment types as set out in Table 20.

Table 20. AROC codes for Orthopaedic conditions, replacement and orthopaedic conditions, all others

AN-SNAP V5 Impairment type group	AROC Impairment Group	AROC Impairment Group Code	AROC Impairment Group Code Description
Orthopaedic conditions, replacement (knee, hip, shoulder)	Post orthopaedic surgery	8.211	Unilateral hip replacement
		8.212	Bilateral hip replacement
		8.221	Unilateral knee replacement
		8.222	Bilateral knee replacement
		8.231	Knee and hip replacement same side
		8.232	Knee and hip replacement different sides
		8.24	Shoulder replacement or repair
Orthopaedic conditions, all others	Post orthopaedic surgery	8.25	Post spinal surgery
		8.26	Other orthopaedic surgery
	Soft tissue injury	8.3	Soft tissue injury

Note: Any trailing numbers attached at the end of AROC code have been removed to form a valid AROC class. For instance, an AROC code of 8.2219 was converted to 8.221 to be categorised as a valid AROC code.

Establishing this new rehabilitation impairment type group was supported by the rehabilitation clinicians and other experts on the SCWG (from both the public and private sectors); and it also received strong support from other stakeholders during the public consultation.

There was also considerable statistical evidence to support the change. The analysis demonstrated the following as support for the new impairment type group:

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[16] Australasian Rehabilitation Outcomes Centre (2013) **AROC Impairment Coding Guidelines**

- a large proportion of the 'Orthopaedic conditions: all others' episodes were related to hip and/or knee replacements (66.3 per cent in private sector and 45 per cent in the public sector)

- the average cost profile of episodes in a new impairment type group 'Orthopaedic conditions, replacement' is distinctly different to the average cost of episodes that would then remain in 'Orthopaedic conditions, all other' (average cost $10,422 to $14,327 respectively)

- creating the new impairment type group and then adjusting the WFIM™ Motor thresholds applied in a subsequent split considerably improved explanatory power compared to AN-SNAP V4, with the addition of three more end-classes.

Consultation spotlight #4

As part of the public consultation feedback, there was a proposal to move shoulder replacements from 'orthopaedic conditions, replacements' to 'orthopaedic conditions, fractures'. This was premised on an observation that post-operative care for shoulder replacements was substantially different to knee and hip replacement post-operative care. And furthermore, that shoulder post-operative care was clinically more closely aligned to upper limb fracture care than lower limb replacement protocols.

IHPA's response

IHPA conducted analysis to investigate the cost and other characteristics of shoulder replacement episodes to compare to the other orthopaedic groups relevant to the proposal (noting that the main comparison group, 'Orthopaedic conditions, fractures' is much broader than just upper limb fractures).

Table 21 summarises the episode volume, average cost and average length of stay for separated upper and lower limb replacement activity and the other impairment groups potentially relevant to the proposal.

Table 21. Orthopaedic conditions, replacement episode characteristics

Category	Episodes	Average cost	Average length of stay	CoV
Orthopaedic conditions, replacement (knee, hip, shoulder)	15,547	$10,422	11.31	0.77
Orthopaedic conditions, replacement (knee and hip only)	15,190	$10,371	11.2	0.77
Orthopaedic conditions, replacement (shoulder only)	357	$12,590	14.5	0.82
Orthopaedic conditions, fractures	31,210	$16,662	17.4	0.78
Orthopaedic conditions, all other	5,663	$14,327	14.9	0.84

The analysis shows that the average cost of shoulder replacement episodes is closer to the knee and hip replacement average (difference of $2,219) than it is to orthopaedic conditions, fractures (difference of $4,072).

On this basis IHPA recommended retaining shoulder replacement activity in the group with knee and hip replacement activity due to the relative cost homogeneity of the three replacement types.

Orthopaedic conditions, all other

There are three 'Orthopaedic conditions, all other' classes as set out in Table 22 (cf. three classes in **V4**).

Table 22. Adult rehabilitation - Orthopaedic conditions, all other group classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Rehabilitation care						
Orthopaedic conditions, all other group						
5A21	Orthopaedic conditions, all other	WFIM Motor 57 - 91	3,018	$11,151	12.05	0.75
5A22	Orthopaedic conditions, all other	WFIM Motor 41 - 56	1,693	$15,951	16.22	0.78
5A23	Orthopaedic conditions, all other	WFIM Motor 19 - 40	952	$21,510	21.46	0.78

These classes have changed with the removal of the 'Orthopaedic conditions, replacement (knee, hip, shoulder*)'* activity as described above, and a subsequent revision of the thresholds to optimise the statistical performance.

Cardiac, Pain syndromes, and pulmonary

There are three 'Cardiac, pain syndromes, and pulmonary' classes in AN-SNAP V5 as set out in Table 23 (cf. four classes in V4).

Table 23. Adult rehabilitation - Cardiac, pain syndromes, and pulmonary classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Rehabilitation care						
Cardiac, Pain syndromes, and Pulmonary						
5A31	Cardiac, Pain syndromes, and Pulmonary	WFIM Motor 66 - 91	4,168	$9,881	10.61	0.74
5A32	Cardiac, Pain syndromes, and Pulmonary	WFIM Motor 38 - 65	6,246	$13,304	14.10	0.73
5A33	Cardiac, Pain syndromes, and Pulmonary	WFIM Motor 19 - 37	1,273	$18,445	18.40	0.80

The only change in AN-SNAP V5 for this branch is a statistically driven reduction from four to three classes with an associated change in thresholds to improve performance.

Major multiple trauma

There are two 'Major multiple trauma' classes in AN-SNAP V5 as set out in Table 24 (cf. one class in **V4**).

Table 24. Adult rehabilitation - Major multiple trauma classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Rehabilitation care						
Major multiple trauma						
5AP1	Major multiple trauma	WFIM Motor 51 - 91	684	$21,873	18.20	1.04
5AP2	Major multiple trauma	WFIM Motor 19 - 50	456	$36,423	27.73	1.14

AN-SNAP V5 introduces a weighted FIM^{TM} Motor split for this impairment to generate two different classes.

Reconditioning

There are five 'Reconditioning' classes in AN-SNAP V5 as set out in Table 25 (cf. six classes in **V4**).

Table 25. Adult rehabilitation - Reconditioning classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Rehabilitation care						
Reconditioning						
5AR1	Reconditioning	WFIM Motor 64 - 91	FIM Cognition 29 - 35	6,744	$10,606	10.79	0.78
5AR2	Reconditioning	WFIM Motor 64 - 91	FIM Cognition 5 - 28	3,654	$13,038	13.36	0.77
5AR3	Reconditioning	WFIM Motor 48 - 63	FIM Cognition 19 - 35	12,065	$13,962	13.70	0.75
5AR4	Reconditioning	WFIM Motor 48 - 63	FIM Cognition 5 - 18	1,947	$17,566	17.68	0.75
5AR5	Reconditioning	WFIM Motor 19 - 47		13,063	$19,228	17.96	0.83

Applying the simulation criteria (Table 7) resulted in the following changes for AN-SNAP V5 classes in comparison to AN-SNAP V4 classes:

- there are five rather than six classes
- there are now three rather than five WFIM^{TM} Motor groups at the first split
- a second order FIM^{TM} Cognition split is applied to all except the lowest WFIM^{TM} Motor groups (as compared to AN-SNAP V4 where there was no FIM^{TM} Cognition applied to the lowest and the highest FIM^{TM} Motor groups)
- thresholds for the WFIM^{TM} Motor and FIM^{TM} Cognition splits have been updated.

Notably, two alternative approaches to splitting Reconditioning classes were suggested by clinicians and investigated by IHPA but ultimately not adopted for AN-SNAP V5.

First, IHPA investigated applying FIM^{TM} Cognition before a weighted FIM^{TM} Motor split. This resulted in a threshold selection for one class at the extreme end of the scale (FIM Cognition score of 3) and the distribution of average costs per FIM^{TM} Cognition split group was not as distinct compared to the WFIM^{TM} Motor split groups.

Second, IHPA investigated using the ICD-10-AM diagnoses Delirium and/or Dementia as a variable applied after WFIM^{TM} Motor. This approach did not perform as well statistically as the WFIM^{TM} Motor followed by FIM^{TM} Cognition approach detailed above.

All other impairments group

There are three 'All other impairments' classes in AN-SNAP V5 as set out in Table 26 (cf. three classes in **V4**).

Table 26. Adult rehabilitation - All other impairments group classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Rehabilitation care						
All other impairment types						
5A91	All other impairments	WFIM Motor 61 - 91	1,070	$12,497	11.80	0.84
5A92	All other impairments	WFIM Motor 42 - 60	935	$17,113	16.05	0.82
5A93	All other impairments	WFIM Motor 19 - 41	631	$22,981	20.01	1.10

The only changes in AN-SNAP V5 for these classes is the update of the FIM^{TM} Motor weights and a statistically driven update of the threshold scores to improve the performance.

4.2.2 Admitted paediatric rehabilitation classes

AN-SNAP V5 has the same admitted paediatric rehabilitation structure (Figure 4) and classes (Table 27) as AN-SNAP V4.[17] This was because there was only a limited volume of paediatric episode data available and it was considered insufficient for robust statistical investigation of any potential changes.

Figure 4. Paediatric rehabilitation structure

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[17] The AN-SNAP V4 Final Report and Classificaton Manual reference an Age Type variable. This was proposed to apply in the rehabilitation and palliative care types to allow the patient to be manually allocated by a clinician to a paediatric or adult end class. The Age type variable could therefore override Age and was available for patients aged between 16 and 19 inclusive. In 2016 IHPA's Sub Acute Care Working Group (SCWG) advised against implementing this variable in the Admitted Subacute and Non-acute Hospital Care National Best Endeavours Data Set (ASNAHC NBEDS) primarily due to the small number of relevant patient episodes. The SCWG confirmed its position again in 2021; and the variable is not used in AN-SNAP V5.

Table 27. Paediatric rehabilitation classes

End class for V5	Description and thresholds for V5	Episodes	Average cost	Average length of stay	CoV
Rehabilitation care					
Paediatric rehabilitation					
5F01	Rehabilitation, Age <= 3	127	$46,681	17.46	1.01
5F02	Rehabilitation, Age >= 4, Spinal cord dysfunction	120	$55,808	30.50	1.17
5F03	Rehabilitation, Age >= 4, Brain dysfunction	350	$54,165	24.27	1.28
5F04	Rehabilitation, Age >= 4, Neurological conditions	212	$24,442	12.30	1.24
5F05	Rehabilitation, Age >= 4, All other impairments	297	$30,888	14.61	1.21
5O01	Paediatric same-day rehabilitation	2,751	$2,997	1.00	0.47

4.2.3 Admitted adult palliative care classes

The admitted adult palliative care branch of AN-SNAP V5 is the same as AN-SNAP **V4**: one same-day class and twelve overnight classes (Figure 5).

Figure 5. Adult Palliative care structure
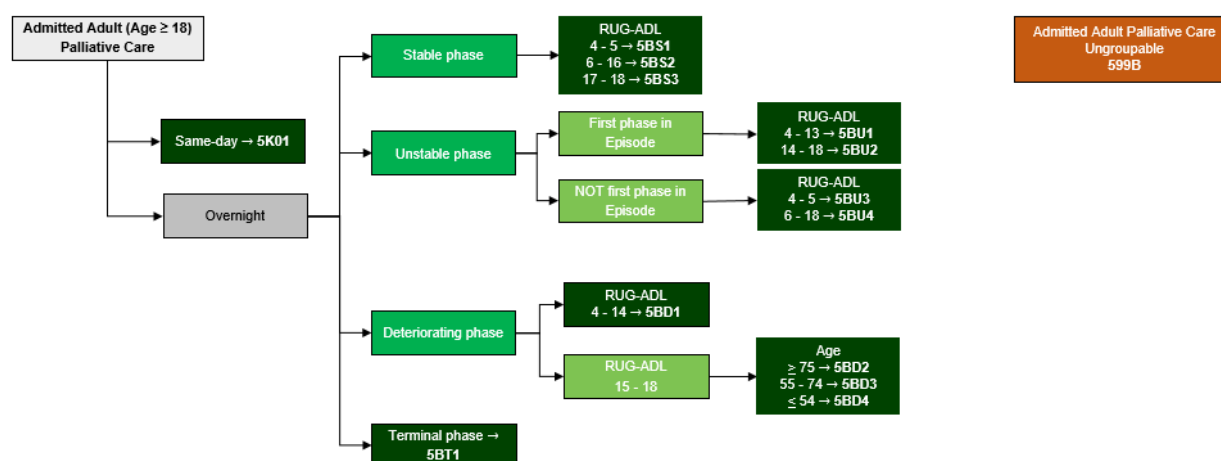
4.2.3.1 Changes considered but not adopted

For the adult palliative care type, the major changes considered for AN-SNAP V5 were:

- reviewing the RUG-ADL and age thresholds to improve statistical performance
- reviewing selected comorbidities, specialist palliative care tools and the CCI as variables for the branch.

IHPA's analysis demonstrated that incorporating comorbidities could reduce the number of end classes and improve statistical performance. However, key stakeholders (including the Palliative Care Outcome Collaboration - PCOC) advised that progressing these changes was an unacceptable risk to the stability of the classification for the anticipated predictive improvement. Key to this argument, which was ultimately accepted by IHPA, was:

- a view that the RUG-ADL is a particularly well-accepted and useful clinical tool for palliative care clinicians and that replacing it with various different comorbidities under each phase type would likely be too great a challenge to the clinical sensibility of the classification

- a concern about the branch becoming too confusing because any improvements in the explanatory power would need the new comorbidities to be applied inconsistently across the different palliative care phases (because diagnosis information is recorded at episode level, not phase level).

Specialist palliative care tools such as the Symptom Assessment Scale and the Australian Modified Karnofsky Performance Scale tool were not further investigated because they are not currently collected as part of the national data sets that are available to IHPA.

4.2.3.2 Same-day class

The AN-SNAP V5 same-day class for admitted adult palliative care (Table 28) is identical to the same-day class for **V4**.

Table 28. Adult palliative care - Same-day class

End class for V5	Description and thresholds for V5	Episodes	Average cost	Average length of stay	CoV
Palliative care					
5K01	Adult same-day palliative care	3,808	$917	1.00	0.94

4.2.3.3 Overnight classes

The twelve AN-SNAP V5 overnight admitted classes for adult palliative care (Table 29) are classified the same as the twelve adult palliative care classes for **V4**.

Table 29. Adult palliative care - Overnight classes

End class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	CoV
Palliative care							
Adult palliative care							
5BS1	Stable phase	RUG-ADL 4-5		7,988	$9,670	6.40	1.20
5BS2	Stable phase	RUG-ADL 6-16		17,075	$10,670	7.28	1.25
5BS3	Stable phase	RUG-ADL 17-18		6,480	$10,051	7.14	1.37
5BU1	Unstable phase	First Phase in Episode	RUG-ADL 4-13	14,270	$5,906	3.55	1.59
5BU2	Unstable phase	First Phase in Episode	RUG-ADL 14-18	9,273	$4,533	3.15	1.67
5UB3	Unstable phase	Not first Phase in Episode	RUG-ADL 4-5	1,317	$5,933	2.32	1.70
5UB4	Unstable phase	Not first Phase in Episode	RUG-ADL 6-18	6,195	$5,425	2.16	2.02
5BD1	Deteriorating phase	RUG-ADL 4-14		16,546	$9,057	5.63	1.30
5BD2	Deteriorating phase	RUG-ADL 15-18	Age >= 75	13,786	$6,188	4.20	1.38
5BD3	Deteriorating phase	RUG-ADL 15-18	Age 55-74	8,128	$7,610	4.58	1.49
5BD4	Deteriorating phase	RUG-ADL 15-18	Age <= 54	1,650	$9,041	5.46	1.52
5BT1	Terminal phase			32,500	$4,911	2.52	1.42

4.2.4 Admitted paediatric palliative care classes

AN-SNAP V5 has the same admitted paediatric palliative care structure (Figure 6) and classes (Table 30) as AN-SNAP V4.[18] This was because there was only a limited volume of paediatric episode data available and it was considered insufficient for robust statistical investigation of any potential changes.

Figure 6. Paediatric palliative care structure
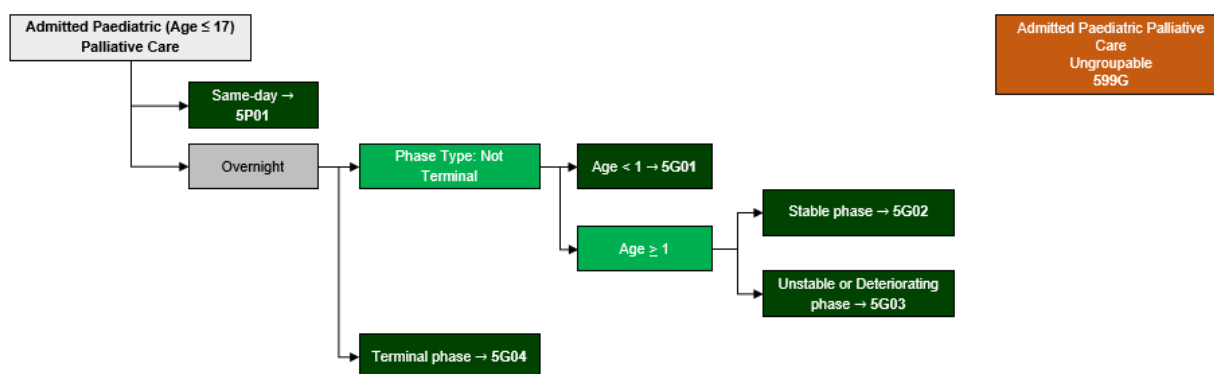
Table 30. Paediatric palliative care classes

End class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	CoV
Palliative care							
Paediatric palliative care							
5G01	Phase Type: Not Terminal	Age < 1 year		56	$34,269	10.02	1.15
5G02	Phase Type: Not Terminal	Age >= 1 year	Stable phase	5	$24,863	1.40	1.55
5G03	Phase Type: Not Terminal	Age >= 1 year	Unstable or Deteriorating phase	221	$28,069	8.10	1.72
5G04	Terminal phase			40	$15,974	4.40	0.94
5P01	Paediatric same-day palliative care			35	$1,961	1.00	0.48

4.2.5 Admitted geriatric evaluation and management classes

The admitted GEM branch of AN-SNAP V5 consists of one same-day class and six overnight classes (Figure 7).

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[18] The AN-SNAP V4 Final Report and Classification Manual reference an Age Type variable. This was proposed to apply in the rehabilitation and palliative care types to allow the patient to be manually allocated by a clinician to a paediatric or adult end class. The Age type variable could therefore override Age and was available for patients aged between 16 and 19 inclusive. In 2016 IHPA's Sub Acute Care Working Group (SCWG) advised against implementing this variable in the Admitted Subacute and Non-acute Hospital Care National Best Endeavours Data Set (ASNAHC NBEDS) primarily due to the small number of relevant patient episodes. The SCWG confirmed its position again in 2021; and the variable is not used in AN-SNAP V5.

Figure 7. Geriatric evaluation and management structure
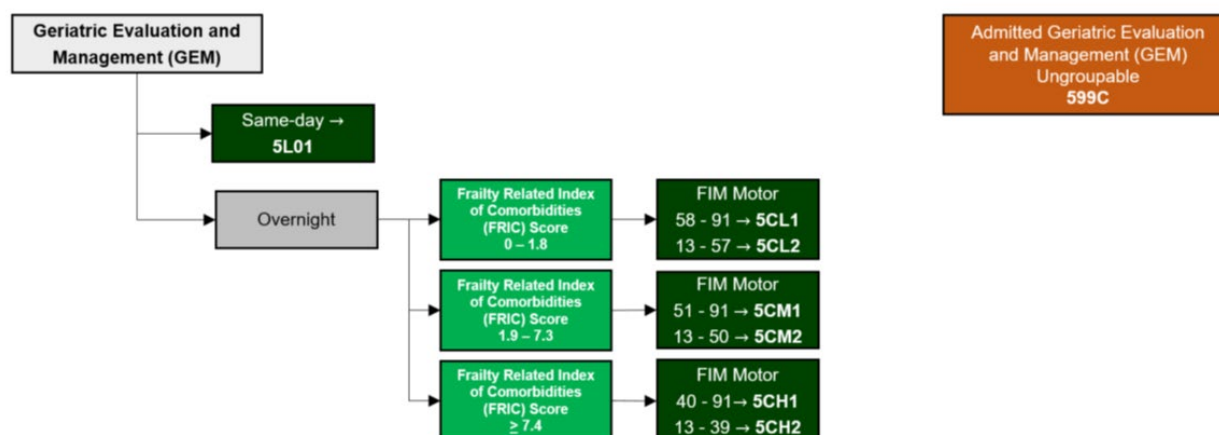
4.2.5.1   Same-day class

The AN-SNAP V5 same-day class for admitted GEM care (Table 31) is identical to the same-day class for **V4**.

Table 31. Geriatric evaluation and management - Same-day class

End class for V5	Description and thresholds for V5	Episodes	Average cost	Average length of stay	CoV
Geriatric evaluation and management					
5L01	Same-day GEM	499	$671	1.00	1.09

4.2.5.2   Overnight classes

The most significant change in AN-SNAP V5 is the introduction of the Frailty Related Index of Comorbidities (FRIC) as the first splitting variable for GEM episodes followed by a split into classes based on a FIM^{TM} Motor (unweighted) score instead of the delirium or dementia variable.

The six AN-SNAP V5 overnight classes for admitted GEM care are as set out in Table 32 (cf. six classes in **V4**).

Table 32. Geriatric evaluation and management - Overnight classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Geriatric evaluation and management						
5CL1	Frailty Related Index of Comorbidities (FRIC) Score 0 - 1.8	FIM Motor 58 - 91	10,555	$9,982	11.52	0.86
5CL2	Frailty Related Index of Comorbidities (FRIC) Score 0 - 1.8	FIM Motor 13 - 57	16,250	$13,474	15.06	0.84
5CM1	Frailty Related Index of Comorbidities (FRIC) Score 1.9 - 7.3	FIM Motor 51 - 91	16,266	$13,390	14.72	0.88
5CM2	Frailty Related Index of Comorbidities (FRIC) Score 1.9 - 7.3	FIM Motor 13 - 50	23,628	$17,305	18.93	0.81
5CH1	Frailty Related Index of Comorbidities (FRIC) Score >= 7.4	FIM Motor 40 - 91	6,823	$18,829	19.93	0.84
5CH2	Frailty Related Index of Comorbidities (FRIC) Score >= 7.4	FIM Motor 13 - 39	8,563	$22,757	23.79	0.80

IHPA tested two potential new variables for GEM as part of the AN-SNAP V5 development: the FRIC and the Standardised Mini-Mental State Examination (SMMSE).[19] The analysis showed that a first split of FRIC and a secondary split of FIM™ Motor outperformed using the SMMSE. The FRIC with FIM™ Motor also outperformed the AN-SNAP V4 structure splits of FIM™ Motor and 'Delirium and/or Dementia' status as demonstrated in Table 33.

Table 33. RID performance of overnight classes for GEM care type – V4 vs V5

Care type	Number of episodes	AN-SNAP V4		AN-SNAP V5 (Using FRIC – post Exclusion Review)	
		# classes	RID	# classes	RID
GEM (overnight classes only)	82,085	6	4.9%	6	7.6%

Notably, the SMMSE tool demonstrated promising results. However, IHPA is not introducing it into AN-SNAP V5 because of the low volume of data available for analysis (only ~3 per cent of episodes); and the FRIC showing the greatest explanatory power.

IHPA acknowledges that introducing the FRIC was not supported by some stakeholders (see Consultation spotlight **#2** and **#3**). Nonetheless, IHPA's view is that it is a suitably beneficial change given:

- There is broad agreement across a wide range of stakeholders that frailty is a cost-driver for subacute care and that it should be recognised in the subacute care classification; but there is no prospective clinical frailty measure immediately available (that is, currently collected as part of the admitted patient national datasets).

- AN-SNAP V4 is remarkably poor at explaining GEM costs, with only 8.2 per cent RID for the care type (all classes); and introducing the FRIC substantially improves the RID to 10.8 per cent (all classes).

- The FRIC can be adopted immediately using data already collected by jurisdictions.

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[19] The SMMSE is part of the ASNAHC NBEDS but collection is sporadic. A small number of episodes (n=2813) were found to be valid for use after data trimming for 2015–16 to 2017–18 financial years, and those episodes were heavily concentrated in a small number of jurisdictions and organisations.

Consultation spotlight #5

As part of the public consultation, several stakeholders expressed concern that the FRIC might diminish or 'water down' the classification's sensitivity to dementia and/or delirium as major drivers for GEM cost, complexity and length of stay.

IHPA's response

Although 'Delirium' and/or 'Dementia' have been removed as binary variables, both diagnoses are among the most heavily weighted in the calculation of the FRIC as demonstrated in Table 34 (see also **Appendix D**).

Table 34. Frailty Related Comorbidity Index with weighting points >= 2.0

ICD-10-AM 3 character code	Code Block Description	Code weighting for Frailty Related Index of Comorbidities (FRIC)	Exclusion review
F00*	**Dementia in Alzheimer's disease**	**7.1**	**Not Excluded.**
G81*	Hemiplegia	4.4	Not Excluded.
G30*	Alzheimer's disease	4.0	Conditionally excluded when G30* code is used with any of F00* codes in the same episode. Otherwise, not excluded.
F05*	**Delirium, not induced by alcohol and other psychoactive substances**	**3.2**	**Not Excluded.**
N39*	Other disorders of urinary system	3.2	Code N39.9 excluded. All other codes not excluded.
R56*	Convulsions, not elsewhere classified	2.6	Not Excluded
S06*	Intracranial injury	2.4	Code S06.00 excluded. All other codes not excluded.
T83*	Complications of genitourinary prosthetic devices, implants and grafts	2.4	Not Excluded
E86	Volume depletion	2.3	Not Excluded.
M25*	Other joint disorders, not elsewhere classified	2.3	Codes M25.09, M25.19, M25.29, M25.39, M25.49, M25.5*, M25.6*, M25.79, M25.89 and M25.9* excluded. All other codes not excluded.
S42*	Fracture of shoulder and upper arm	2.3	Not Excluded
F03	**Unspecified dementia**	**2.1**	**Not Excluded.**
F01*	**Vascular dementia**	**2.0**	**Not Excluded.**
L03*	Cellulitis	2.0	Codes L03.19 and L03.9 excluded. All other codes not excluded.

4.2.6 Admitted psychogeriatric classes

The admitted psychogeriatric branch of AN-SNAP V5 consists of one same-day class and three overnight classes (Figure 8).

Figure 8. Psychogeriatric structure
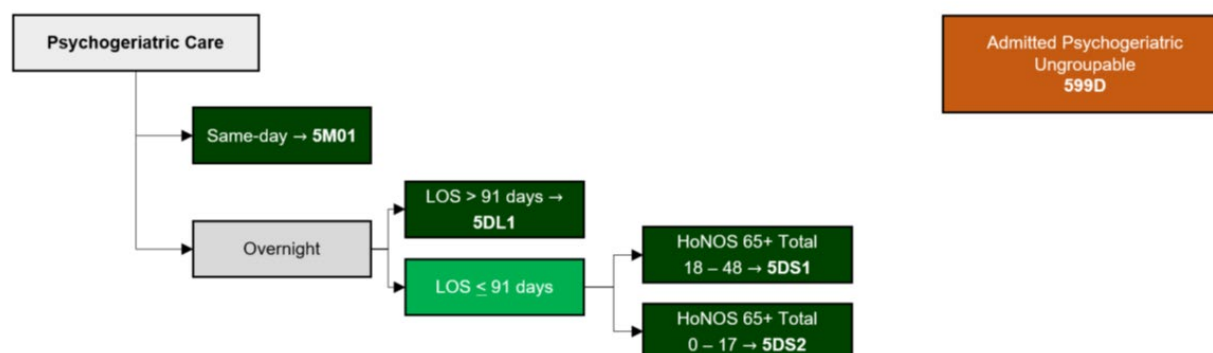
4.2.6.1   Same-day class

The AN-SNAP V5 same-day class for admitted psychogeriatric care (Table 35) is identical to the same-day class for **V4**.

Table 35. Psychogeriatric care - Same-day class

End class for V5	Description and thresholds for V5	Episodes	Average cost	Average length of stay	CoV
Psychogeriatric care					
5M01	Same-day psychogeriatric care	85	$778	1.00	0.5

4.2.6.2   Overnight classes

The three AN-SNAP V5 overnight classes for admitted psychogeriatric care are as set out in Table 36 (cf. six classes in **V4**).

Table 36. Psychogeriatric care - Overnight classes

End class for V5	Description and thresholds for V5		Episodes	Average cost	Average length of stay	CoV
Psychogeriatric care						
5DL1	Long term care (LoS > 91 days)		87	$185,838	131.66	0.58
5DS1	LoS =< 91 days	HoNOS 65+ Total 18 - 48	1,351	$26,599	19.37	1.11
5DS2	LoS =< 91 days	HoNOS 65+ Total 0 - 17	1,493	$33,258	21.95	1.06

As part of the AN-SNAP V5 development, IHPA first consulted whether to retain the psychogeriatric care type in AN-SNAP V5, given its overlap with the Australian Mental Health Care Classification (AMHCC) and:

- significant variation between jurisdictions' assignment of this care type, with episodes heavily concentrated in two jurisdictions (New South Wales and Western Australia)

- low volume of episodes for the care type.

Following stakeholder advice that the care type be retained, the major changes considered for AN-SNAP V5 were:

- reviewing the LoS and HONOS 65+ total and individual item score variables and/or thresholds to improve statistical performance

- considering the FRIC or CCI as potential new variables.

The analysis showed that the introduction of the FRIC improved explanatory power for those episodes with a HoNOS 65+ total score greater than 18, but that the statistical improvement was less than 1 per cent. Given this marginal improvement and the disruptive impact of introducing a new non-mental health specific variable, IHPA ruled out the FRIC as a new variable for AN-SNAP V5 for the psychogeriatric care type.

Subsequent analysis then demonstrated that splitting the psychogeriatric short term care episodes into two classes, using a HoNOS 65+ total score, outperformed the AN-SNAP V4 five classes (first split using HoNOS 65+ Overactive Behaviours and a second split using HoNOS 65+ Problems with activities of daily living and total scores).

Despite this improved predictive performance, one jurisdiction with a high volume of psychogeriatric care has consistently expressed concern about changing to a HoNOS 65+ total score from the current approach. Its view is that the current approach appropriately focus the classes on the two individual item scores in the HONOS 65+ that are most relevant for clinical care and staffing (item 1: Overactive behaviour and item 10: Problems with activities of daily living).

Further consultation on this issue with other stakeholders was inconclusive. One jurisdiction and a major health facility providing psychogeriatric care indicated support for using a HoNOS 65+ total score, and the other jurisdiction with a concentration of psychogeriatric care did not offer comment. IHPA has therefore decided that, on balance, it is appropriate to adopt the simpler and statistically better performing approach of using the HoNOS 65+ total score to split short stay overnight episodes in the psychogeriatric care type. This will also more closely aligned the approach used in the psychogeriatric care type to that used for the AMHCC.

4.2.7 Admitted non-acute classes

The admitted non-acute branch of AN-SNAP V5 consists of five overnight classes. No changes are proposed to the long term care (>= 91 days) end class but a new structure is introduced to classify the shorter term episodes (<= 91 days)

The structural change is for short term episodes in the non-acute care type to continue to have age applied as the first splitting variable but to then replace the RUG-ADL with the FRIC as the secondary split (for the older 65 years of age group only) as illustrated in Figure 9.

Figure 9. Non-acute structure
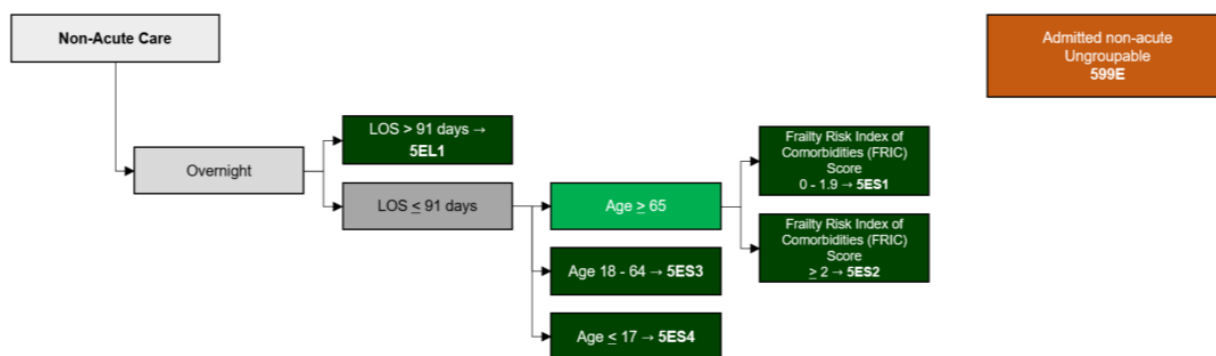
4.2.7.1   Overnight classes

The five AN-SNAP V5 overnight classes for admitted non-acute care are as set out in Table 37 (cf. six classes in **V4**).

Table 37. Non-acute care - Overnight classes

End class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	CoV
Non-acute							
5EL1	Long-term care (LoS > 91 days)			586	$142,717	132.97	0.55
5ES1	Shorter term care LoS =< 91 days	Age >= 65	Frailty Related Index of Comorbidities (FRIC) Score 0 - 1.9	17,981	$9,592	9.62	1.12
5ES2	Shorter term care LoS =< 91 days	Age >= 65	Frailty Related Index of Comorbidities (FRIC) Score >= 2	26,723	$13,398	13.02	1.08
5ES3	Shorter term care LoS =< 91 days	Age = 18-64		7,365	$16,006	13.64	1.29
5ES4	Shorter term care LoS =< 91 days	Age =< 17		133	$20,562	10.77	1.48

The FRIC was selected as a new variable after it outperformed the AN-SNAP V4 variables (as well as social factor comorbidities and the CCI). However, given the age split (and particularly the paediatric age less than or equal to 17 years class) was only recently introduced as part of AN-SNAP V4, IHPA decided to retain the age variable as the second split after LoS. The analysis then tested for a third splitting variable for the age 65 and over group and the result was the FRIC outperformed the RUG-ADL variable. For the age 18 to 64 group, the FRIC was not applied (despite the improved performance) due to the younger age range; and the RUG-ADL was not used as it did meet the established decision criteria.

5. Statistical performance of the AN-SNAP V5 model

The Independent Hospital Pricing Authority (IHPA) has calculated the overall statistical performance of the Australian National Subacute and Non-Acute Patient Classification (AN-SNAP) Version 5.0 (V5) using the Reduction in Deviance (RID) statistic. This is a measure how much of the classification explains variability in cost, expressed as a percentage. The higher the RID percentage value, the higher the percentage of cost variation that is explained by the classification.

The RID for AN-SNAP V5 is 54.3 per cent. This is an improvement of 0.4 per cent to the 53.9 per cent RID for AN-SNAP V4. Notably, AN-SNAP V5 achieves this improved statistical performance while also simplifying the admitted branch from 103 to 97 end-classes.

As demonstrated in Table 38, while all care types improved, the largest increases were Geriatric evaluation and management (2.6 per cent) and non-acute (2.0 per cent) representing proportional improvement of 31.7 per cent and 13.0 per cent respectively.

As noted earlier, it is important to acknowledge that the statistical performance of the classification (or part of a classification), as represented by RID, does not indicate how 'effectively' those services are priced for activity based funding (ABF) purposes. Ultimately, the price of admitted subacute and non-acute activity is determined by the classification in combination with a range of adjustments and cost parameters that are applied through the national pricing model.[20]

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[20] See, for example, Independent Hospital Pricing Authority, **National Pricing Model 2021-22 – Technical Specifications – March 2021**

Table 38. Statistical performance of AN-SNAP V5 compared to AN-SNAP V4 for subacute episodes by care type

Care type	Subgroup	Episodes[1]	AN-SNAP V4		AN- SNAP V5	
			# Classes	RID	# Classes	RID
Adult rehabilitation care	Same Day	78,289	1	0.0%	1	0.0%
	Overnight	152,204	50	22.1%	48	23.2%
	All	230,493	51	74.0%	49	74.3%
Paediatric rehabilitation care	Same Day	2,751	1	0.0%	1	0.0%
	Overnight	1,106	5	9.6%	5	9.6%
	All	3,857	6	77.6%	6	77.6%
Adult palliative care	Same Day	3,808	1	0.0%	1	0.0%
	Overnight	135,208	12	7.5%	12	7.5%
	All	139,016	13	11.9%	13	11.9%
Paediatric palliative care	Same Day	35	1	0.0%	1	0.0%
	Overnight	322	4	3.1%	4	3.1%
	All	357	5	23.7%	5	23.7%
GEM care	Same Day	499	1	0.0%	1	0.0%
	Overnight	82,085	6	4.9%	6	7.6%
	All	82,584	7	8.2%	7	10.8%
Psychogeriatric care	Same Day	85	1	0.0%	1	0.0%
	Short Term	2,844	5	0.6%	2	1.2%
	Long Term	87	1	0.0%	1	0.0%
	All	3,016	7	25.7%	4	26.2%
Non-acute	Short Term	52,202	5	1.2%	4	3.5%
	Long Term	586	1	0.0%	1	0.0%
	All	52,788	6	15.4%	5	17.4%
Total		512,111	6 same day 89 overnight 8 ungroupable	53.9%	6 same day 83 overnight 8 ungroupable	54.3%

(1) The episodes reported here reflects the total dataset of merged National Hospital Cost Data Collection and Admitted Patient Care data for 2015–16, 2016–17, and 2017–18 excluding trimmed episodes detailed in Table 5.

5.1.1 End class characteristics

The variables, thresholds, and descriptive information about the end classes (episodes, average cost, average length of stay, coefficient of variation) calculated using the three year dataset (2015–16, 2016–17 and 2017–18) is at **Appendix G.**

6. AN-SNAP V5 class naming convention

Australian National Subacute and Non-Acute Patient Classification (AN-SNAP) Version 5.0 (V5) keeps the same four-character alphanumeric class labelling system, which was established for AN-SNAP Version 4.0. Table 39 summarises the features of the system with further details at **Appendix I**.

Notably, AN-SNAP V5 continues to presents end-classes (in tree diagrams, tables etc) so that the classes are sequenced according to the severity of functional impairment. For example, bigger fourth character numbers generally indicate more functionally impaired (complex) episodes (according to the last splitting variable).

Table 39. AN-SNAP V5 class naming convention summary

Character position	Character type	Item
1	Numeric	AN-SNAP version number
2	Alphabetic	Alphabetic character referring to a combination of: • whether the care is **adult or paediatric** care • the **care type** (Rehabilitation, palliative care, geriatric evaluation and management, psychogeriatric, and non-acute) • the **treatment setting** (admitted overnight, admitted same-day, non-admitted).
	Numeric	Numeric character to indicate **error class** because the grouping variable is missing.
3	Alphanumeric	Alphanumeric code set referring to: • **low function** (weighted Functional Independence Measure - FIM™) • **impairment type** (single impairment or impairment group) • palliative care phase • length of stay • other characteristics for non-admitted care
4	Numeric	Numeric character applied to classes sequentially after the first split.
	Alphanumeric	Alphanumeric character to indicate **error class** because: • episode is ungroupable • there is an error with episode type or care type.

7. Future work

7.1.1 Rockwood Clinical Frailty Scale

As part of the public consultation for Australian National Subacute and Non-Acute Patient Classification (AN-SNAP) Version 5.0 (V5), the Independent Hospital Pricing Authority (IHPA) asked stakeholders if they preferred any particular prospective clinical frailty instrument being prioritised for future consideration for activity based funding purposes.

The submissions showed clear support for the Rockwood Clinical Frailty Scale as a preferred prospective national measure for assessing patient frailty in subacute admitted settings for further investigation by IHPA. The main reasons cited were that Rockwood:

- is captured at the beginning of an episode so it can support care planning

- has demonstrated clinically relevance and can be used for clinical management purposes, such as planning length of stay and care goals

- has a broad range of possible applications so could be used for multiple care types

- can be administered quickly (around five minutes).

As a result of this feedback IHPA will investigate the feasibility and usefulness of introducing Rockwood as a data element in the Admitted Subacute and Non-acute Hospital Care National Best Endeavours Data Set (ASNAHC NBEDS) commencing 1 July 2023. This will enable IHPA to collect data to inform the on-going refinement of the classification.

7.1.2 WeeFIM™

The Functional Independence Measure (FIM™) has been included in the ASNAHC NBEDS since 2014 to collect data on a person's level of independence to carry out activities of daily living. The MeTeOR *Person—level of functional independence, Functional Independence Measure score code N* data element is used to report a score for each one of the 18 items that comprise the FIM™ instrument.[21]

The Functional Independence Measure for children (WeeFIM™) is a similar basic indicator for change in the severity of a child's functioning. The tool is also comprised of 18 items with clinicians rating each item from 1-7 based on the level of assistance required.

During the development of AN-SNAP V5, WeeFIM™ was considered as a potential variable for the classification. However, with WeeFIM™ is not currently collected as part of the ASNAHC NBEDS, there was insufficient data available to IHPA for investigation.

On the basis of strong consultation feedback, IHPA will investigate including WeeFIM™ as a patient level data item in the ASNAHC NBEDS 2023–24 on a best endeavours basis. This will include considering the benefits of aligning the WeeFIM™ collection with the Australian Paediatric Rehabilitation Outcomes Collection requirements.

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[21] See Australian Institute of Health and Welfare, **Metadata Online Data Registry (MeTeOR) identifier 717982**

Appendix A — Subacute Care Working Group

Table 40. Independent Hospital Pricing Authority - Subacute Care Working Group

Organisation / jurisdiction
IHPA Clinical Advisory Committee member
Representatives from each Australian jurisdiction
Royal Australasian College of Physicians rehabilitation specialists
RACP geriatrician specialists
RACP palliative care specialists
RACP paediatric specialists
Allied Health Professions Australia
Palliative Care Australia
Australasian Rehabilitation Nurses' Association
Australian Health Services Research Institute, University of Wollongong
Royal Australian and New Zealand College of Psychiatrists
Australian Private Hospitals Association
Australian Health Service Alliance
Private Healthcare Australia

Appendix B — Public consultation submissions

IHPA received fifteen submissions as part of the AN-SNAP V5 public consultation process as listed in Table 41. All submissions are available on the **IHPA website**.

Table 41. AN-SNAP V5 Public consultation submissions

	Organisation / jurisdiction
1.	Department of Health - Victoria
2.	Clinical Coders' Society of Australia Inc.
3.	Australian Health Services Research Institute – University of Wollongong
4.	Wide Bay Hospital and Health Service (Queensland)
5.	Department of Health - South Australia
6.	Australian and New Zealand Society for Geriatric Medicine
7.	Queensland Nurses and Midwives Union
8.	South East Sydney Local Health District
9.	Department of Health - Tasmania
10.	Australian College of Nursing
11.	Australasian Rehabilitation Nurses' Association
12.	Metro North Health
13.	Agency for Clinical Innovation NSW
14.	New South Wales Health
15	Northern Territory Health

Appendix C — Method to explore potential new variables

The Independent Hospital Pricing Authority (IHPA) used a four step method to explore the new variables considered for the fifth version (V5) of the Australian National Subacute and Non-Acute Patient (AN-SNAP) classification as illustrated below:

Step 1:
Identify new variables

Step 2:
Short list potential variables (CART Algorithm)

Step 3:
Simulate possibilities and apply threshold criteria

Step 4:
Determine final end-class selection
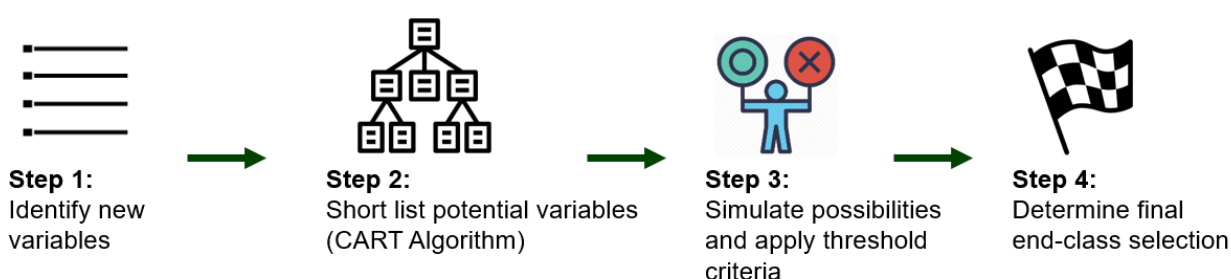
Step 1 – Identify new variables

IHPA identified new variables based on clinical and other stakeholder suggestions and analysis of subacute and non-acute data from 2015 –16 to 2017–18 financial years to identify high volume and average cost variables.

Step 2 – Short list potential variables

IHPA applied the Classification and Regression Tree (CART) algorithm to the combination of new and existing variables to assess:

- Optimal Order - the splitting order of the variables based of explanatory power with cost

- Interaction - how these variables interact.

The CART algorithm is a machine learning modelling technique for regression and classification problems. It provides a hierarchy decision tree with respect to an outcome variable (cost). The Figure below demonstrates the decision tree results using the AN-SNAP Reconditioning impairment type as an example.

CART output for Reconditioning impairment type
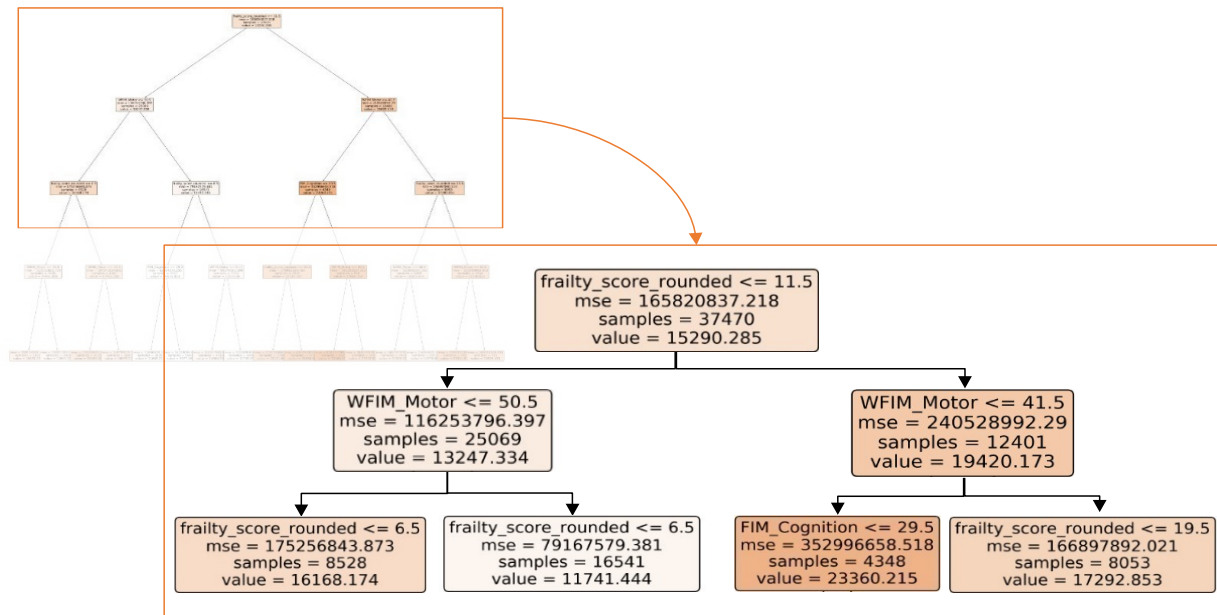
As demonstrated in the example, of those variables considered for the Reconditioning impairment type, the Frailty Related Index of Comorbidities (FRIC) was identified as the variable with the highest explanatory power for cost, followed by the weighted Functional Impairment Measure[TM] (FIM[TM]) Motor score – WFIM[TM]. After the first FRIC split, the second level splits both adopted WFIM[TM] Motor. Therefore, the CART algorithm helps determine the order and interaction of the best performing variables (that is,FRIC and WFIM[TM] Motor for the Reconditioning impairment type).

Step 3 – Split threshold simulations

The third step in this process was to identify the optimal threshold split simulations that achieved the highest Reduction in Deviance (RID) while satisfying seven decision criteria set out in Table 42.

For example, continuing the Reconditioning impairment scenario, with the potential variables Frailty and WFIM[TM] Motor identified, the threshold criteria outlined in Table 7 are applied to identify the optimal threshold split simulations that achieved the highest RID.

Table 42. Decision criteria for split threshold simulations

	Criteria	Optimum Threshold	Principle
1	Minimum episodes per category of 200 per year	✓	Robust episode volume and total aggregated cost per end class for stability
2	Minimum cost per category of $1m per year	✓	
3	Minimum percentage per category of 10% per year	✓	
4	Minimum absolute change in mean cost of $2,000 between consecutive categories	Either Criteria 4 or Criteria 5	Significant difference in average cost between end-classes
5	Minimum relative change in mean cost of 1.5 (or 1.5^{-1}) between consecutive categories		
6	Maximum coefficient of variation of 1.5	✓	Satisfactory homogeneity of each end-class
7	Number of splits determined by the subsequent increase in RID. The minimum increase in RID must be greater than 1% to warrant an extra split.	✓	Significant RID improvement (i.e. 1%) to warrant an increase in the number of end classes.

Step 4 – Final end class selection

Based on the simulations that met the threshold criteria outlined in Table 7, the following additional factors were considered for final end class selection:

- RID performance: From all simulations that met the threshold criteria, the simulations with the highest RID was proposed

- Clinically Coherence: The proposed selection was also assessed with respects to clinically coherency (that is, do the proposed measures make clinical sense?)

- Stability: the relatively stable to the previous classification (that is, do the proposed changes create potential instability within the classification?).

Appendix D — Incorporating a measure related to frailty

Background

The challenge of frailty

Frailty is a decline in multiple physiological systems that makes a person more vulnerable to poor outcomes from minor stressor events. [22] Early in the project to develop the fifth version (V5) of the Australian National Subacute and Non-Acute Patient Classification (AN-SNAP), clinicians noted that subacute care had an increasing proportion of patients with frailty; they were complex, which was likely to be a significant cost driver; and that the current classification variables did not capture this well. In particular, the Independent Hospital Pricing Authority (IHPA) Subacute Care Working Group proposed that measures of frailty be explored for potential inclusion in AN-SNAP, particularly in the Geriatric evaluation and management (GEM) and Rehabilitation, reconditioning impairment type.

Notwithstanding considerable interest across all Australian jurisdictions, clinicians acknowledge that frailty is difficult to conceptualise and measure consistently. Further, and most importantly for this project, there is no clinical frailty tool currently reported in the Australian admitted care national data sets. Accordingly, IHPA considered approaches that could use data already collected as a proxy for frailty.

Literature review

Following a literature search, IHPA proposed adapting a method that had been reported in a 2018 study by Gilbert and colleagues: *Development and validation of a Hospital Frailty Risk Score focusing on older people in acute care settings using electronic hospital records: an observational study* (frailty study).[23]

The frailty study developed and validated a proxy approach of using International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) codes as proxy markers of frailty by:

- using cluster analysis to identify a distinct group of patients admitted to hospital with characteristics of frailty that could be identified on the basis of ICD-10 codes and resource use

- creating a Hospital Frailty Risk Score using ICD-10 codes that were overrepresented in that group (the codes were at least twice as more prevalent in frail group compared to the rest of the cohort)

- demonstrating that the Hospital Frailty Risk Score predicted adverse outcomes after emergency admission; and had fair to moderate agreement with other frailty scores (which reflects the 'normal' sort of agreement between frailty measures).

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22 Adapted from Clegg A, Young J, Iliffe S, Rikkert M, Rockwood, K. (2013) *Frailty in elderly people*, Lancet; 381:   752-62.

23 Gilbert T, Neuburger J, Kraindler J, et al, (2018*) Development and validation of a Hospital Frailty Risk Score focusing on older people in acute care settings using electronic hospital records: an observational study*. Lancet; 391: 1775 - 82

Adapting the Hospital Frailty Risk Score for Australian subacute and non-acute care activity based funding purposes

The Hospital Frailty Risk Score identified 109 ICD-10 code blocks as markers of frailty to calculate the associated frailty risk score. To adapt this set of code blocks to be appropriate for Australian activity based funding purposes, IHPA first mapped the ICD-10 code blocks to ICD-10-AM, the Australian modification of ICD-10.

All mappings (and the respective individual frailty risk scores) of each code block remained the same except for the substitution of **U80** *Agent resistant to penicillin and related antibiotics* to ICD-10-AM code **Z06.51** *Resistance to penicillin*.

The three character code blocks were then expanded to include all valid three, four and five character ICD-10-AM codes. For example **F00** *Dementia in Alzheimer's disease* includes; **F00.0** *Dementia in Alzheimer's disease with early onset*, **F00.1** *Dementia in Alzheimer's disease with late onset*, **F00.2** *Dementia in Alzheimer's disease, atypical or mixed type* and **F00.9** *Dementia in Alzheimer's disease, unspecified*.

The ICD-10-AM code blocks of the IHPA adaption of the Hospital Frailty Risk Score are shown in Table 43.

Exclusion Review

The second stage of adapting the original codes to ensure they would be fit-for-purpose involved identifying and excluding:

- codes considered to provide additional or supplementary information to another code already assigned

- codes describing an ill-defined and/or transient condition of symptoms

- codes providing context rather than information critical to the clinical description of an episode of care.

This process (the Exclusion Review), used guiding principles established and used similarly for the acute care classification to exclude certain codes from being assigned a higher complexity marker (Guiding principles for exclusion of the ICD-10-AM diagnosis codes).[24]

The full criteria for exclusions were:

- codes that represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM

- codes that represent symptoms and findings or transient conditions that are better represented by other more specific codes within ICD-10-AM

- codes that provide additional or contextual information to an already assigned ICD-10-AM code

- unacceptable principal diagnosis codes, unless deemed capable of providing information critical to the clinical description of an admitted acute episode of care

- codes that represent asymptomatic or sub-clinical conditions for example, latent conditions

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[24] Independent Hospital Pricing Authority (2019) *Australian Refined Diagnosis Related Groups Version 10.0 Final Report.*

- codes that represent markers of other diseases

- codes that represent minor conditions that do not generally result in an admitted subacute episode of care

- codes that represent an underlying cause of disease but do not add to the complexity of a subacute episode of care in themselves.

IHPA applied the criteria to the 109 codes as per Table 43. The ICD-10-AM codes remaining after the Exclusion Review and their weighting are IHPA's Frailty Related Index of Comorbidities (FRIC).

Table 43. Adapting the Hospital Frailty Risk Score for activity based funding purposes - the Exclusion Review

ICD-10-AM 3 character code	Code block description	Exclusion Review	Rationale for exclusion	Code weighting for Frailty Risk Comorbidity Index (FRIC)
A04*	Other bacterial intestinal infection	Not Excluded.	N/A	1.1
A09*	Other gastroenteritis and colitis of infectious origin	Not Excluded.	N/A	1.1
A41*	Other sepsis	Not Excluded.	N/A	1.6
B95*	Streptococcus and staphylococcus as the cause of diseases classified to other chapters	All codes excluded.	These codes provide additional specificity to already captured conditions.	N/A
B96*	Other bacterial agents as the cause of diseases classified to other chapters	All codes excluded.	These codes provide additional specificity to already captured conditions.	N/A
D64*	Other anaemias	Not Excluded.	N/A	0.4
E05*	Thyrotoxicosis [hyperthyroidism]	Not Excluded.	N/A	0.9
E16*	Other disorders of pancreatic internal secretion	Code E16.2 excluded. All other codes not excluded	This code is non-specific, reflects poor documentation practice and has been supported for exclusion in funding models as it is likely to be insignificant.	1.4
E53*	Deficiency of other B group vitamins	Not Excluded.	N/A	1.9
E55*	Vitamin D deficiency	Code E55.9 excluded. Other code not excluded.	This code is non-specific, reflects poor documentation practice and has been supported for exclusion in funding models as it is likely to be insignificant.	1.0
E83*	Disorders of mineral metabolism	All codes excluded.	These codes represent transient conditions or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
E86	Volume depletion	Not Excluded.	N/A	2.3
E87*	Other disorders of fluid, electrolyte and acid-base balance	All codes excluded.	These codes represent transient conditions or ill-specified conditions that are better	N/A

ICD-10-AM 3 character code	Code block description	Exclusion Review	Rationale for exclusion	Code weighting for Frailty Risk Comorbidity Index (FRIC)
			represented by other more specific codes within ICD-10-AM.	
F00*	Dementia in Alzheimer's disease	Not Excluded.	N/A	7.1
F01*	Vascular dementia	Not Excluded.	N/A	2.0
F03	Unspecified dementia	Not Excluded.	N/A	2.1
F05*	Delirium, not induced by alcohol and other psychoactive substances	Not Excluded.	N/A	3.2
F10*	Mental and behavioural disorders due to use of alcohol	Code F10.9 excluded All other codes not excluded.	This code is non-specific, reflects poor documentation practice and has been supported for exclusion in funding models as it is likely to be insignificant.	0.7
F32*	Depressive episode	Not Excluded.	N/A	0.5
G20	Parkinson's disease	Not Excluded.	N/A	1.8
G30*	Alzheimer's disease	Conditionally excluded when G30* code is used with any of F00* codes in the same episode. Otherwise, not excluded.[1]	This code is considered as a duplicate code when used with F00* code and hence, is excluded to avoid double counting.	4.0
G31*	Other degenerative diseases of nervous system, not elsewhere classified	Not Excluded.	N/A	1.2
G40*	Epilepsy	Not Excluded.	N/A	1.5
G45*	Transient cerebral ischaemic attacks and related syndromes	Not Excluded.	N/A	1.2
G81*	Hemiplegia	Not Excluded.	N/A	4.4
H54*	Visual impairment including binocular or monocular blindness	Codes H54.3 and H54.9 excluded. All other codes not excluded.	These codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	1.9
H91*	Other hearing loss	Not Excluded.	N/A	0.9
I63*	Cerebral Infarction	Not Excluded.	N/A	0.9
I67*	Other cerebrovascular diseases	Code I67.9 excluded. All other codes not excluded.	This code is non-specific, reflects poor documentation practice and has been supported for exclusion in funding models as it is likely to be insignificant.	2.6
I69*	Sequelae of cerebrovascular disease	All codes excluded.	These codes provide additional specificity to already captured conditions.	N/A
I95*	Hypotension	Not Excluded.	N/A	1.6
J18*	Pneumonia, organism unspecified	Not Excluded.	N/A	1.1

ICD-10-AM 3 character code	Code block description	Exclusion Review	Rationale for exclusion	Code weighting for Frailty Risk Comorbidity Index (FRIC)
J22	Unspecified acute lower respiratory infection	Not Excluded.	N/A	0.7
J69*	Pneumonitis due to solids and liquids	Not Excluded.	N/A	1.0
J96*	Respiratory failure, not elsewhere classified	Not Excluded.	N/A	1.5
K26*	Duodenal ulcer	Code K26.9 excluded. All other codes not excluded.	This code is non-specific, reflects poor documentation practice and has been supported for exclusion in funding models as it is likely to be insignificant.	1.6
K52*	Other noninfective gastroenteritis and colitis	Not Excluded.	N/A	0.3
K59*	Other functional intestinal disorders	Codes K59.0, K59.1, K59.4 and K59.9 excluded. All other codes not excluded.	These codes represent transient conditions or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	1.8
K92*	Other diseases of digestive system	Code K92.9 excluded. All other codes not excluded.	This code is non-specific, reflects poor documentation practice and has been supported for exclusion in funding models as it is likely to be insignificant.	0.8
L03*	Cellulitis	Codes L03.19 and L03.9 excluded. All other codes not excluded.	These codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	2.0
L08*	Other local infections of skin and subcutaneous tissue	Codes L08.1, L08.8, and L08.9 excluded. Code L08.0 not excluded.	These codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	0.4
L89*	Pressure injury	Not Excluded.	N/A	1.7
L97*	Ulcer of lower limb, not elsewhere classified	Not Excluded.	N/A	1.6
M15*	Polyarthrosis	Code M15.9 excluded. All other codes not excluded.	This code is not assigned in Australia for admitted patients as per the Australian Coding Standards (ACS)	0.4
M19*	Other arthrosis	Codes M19.09, M19.19, M19.29, M19.89 and M19.9* excluded. All other codes not excluded.	M19.09, M19.19, M19.29 and M19.89 codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant. M19.9* codes are not assigned in Australia for admitted patients as per the Australian Coding Standards (ACS)	1.5

ICD-10-AM 3 character code	Code block description	Exclusion Review	Rationale for exclusion	Code weighting for Frailty Risk Comorbidity Index (FRIC)
M25*	Other joint disorders, not elsewhere classified	Codes M25.09, M25.19, M25.29, M25.39, M25.49, M25.5*, M25.6*, M25.79, M25.89 and M25.9* excluded. All other codes not excluded.	These codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	2.3
M41*	Scoliosis	Codes M41.09, M41.19, M41.29, M41.39, M41.49, M41.59 and M41.99 excluded. All other codes not excluded.	These codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	0.9
M48*	Other spondylopathies	Codes M48.09, M48.19, M48.29, M48.39, M48.49, M48.59, M48.89 and M48.99 excluded. All other codes not excluded.	These codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	0.5
M79*	Other soft tissue disorders, not elsewhere classified	Codes M79.0*, M79.1*, M79.29, M79.3*, M79.49, M79.59, M79.6*, M79.79, M79.86, M79.89 and M79.9* excluded. All other codes not excluded.	For M79.0* codes, clinical advice stated rheumatism is outdated terminology. Arthritis and osteoarthritis are captured in the frailty risk score. M79.1* codes represent ill-specified conditions that are better represented by other more specific codes within ICD-10-AM. M79.3*, M79.29, M79.49, M79.59, M79.6*, M79.79, M79.86, M79.89, M79.9* codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	1.1
M80*	Osteoporosis with pathological fracture	Codes M80.09, M80.19, M80.29, M80.39, M80.49, M80.59 and M80.99 excluded. All other codes not excluded.	These codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	0.8
M81*	Osteoporosis without pathological fracture	Codes M81.19, M81.49, M81.59, M81.69, M81.89 and M81.99 excluded. All other codes not excluded	These codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	1.4
N17*	Acute kidney failure	Not Excluded.	N/A	1.8
N18*	Chronic kidney disease	Codes N18.1 to N18.3 excluded.	Clinical advice stated these stages are mild and mostly asymptomatic.	1.4

ICD-10-AM 3 character code	Code block description	Exclusion Review	Rationale for exclusion	Code weighting for Frailty Risk Comorbidity Index (FRIC)
		All other codes not excluded.		
N19	Unspecified kidney failure	Excluded.	This code is non-specific, reflects poor documentation practice and has been supported for exclusion in funding models as it is likely to be insignificant.	N/A
N20*	Calculus of kidney and ureter	Not Excluded.	N/A	0.7
N28*	Other disorders of kidney and ureter, not elsewhere classified	Codes N28.1 and N28.9 excluded. All other codes not excluded.	These codes are non-specific, reflect poor documentation practice and have been supported for exclusion in funding models as they are likely to be insignificant.	1.3
N39*	Other disorders of urinary system	Code N39.9 excluded. All other codes not excluded.	This code is non-specific, reflects poor documentation practice and has been supported for exclusion in funding models as it is likely to be insignificant.	3.2
R00*	Abnormalities of heart beat	All codes excluded except R00.3.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	0.7
R02	Gangrene, not elsewhere classified	Not Excluded.	N/A	1.0
R11	Nausea and vomiting	Excluded.	This code represents undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R13	Dysphagia	Excluded.	This code represents undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R26*	Abnormalities of gait and mobility	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R29*	Other symptoms and signs involving the nervous and musculoskeletal systems	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R31	Unspecified haematuria	Excluded.	This code represents undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R32	Unspecified urinary incontinence	Not Excluded.	N/A	1.2
R33	Retention of urine	Excluded.	This code represents undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R40*	Somnolence, stupor and coma	All codes excluded except R40.2.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	2.5

ICD-10-AM 3 character code	Code block description	Exclusion Review	Rationale for exclusion	Code weighting for Frailty Risk Comorbidity Index (FRIC)
R41*	Other symptoms and signs involving cognitive functions and awareness	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R44*	Other symptoms and signs involving general sensations and perceptions	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R45*	Symptoms and signs involving emotional state	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R47*	Speech disturbances, not elsewhere classified	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R50*	Fever of unknown origin	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R54	Senility	Excluded.	This code represents undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R55	Syncope and collapse	Excluded.	This code represents undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R56*	Convulsions, not elsewhere classified	Not Excluded	N/A	2.6
R63*	Symptoms and signs concerning food and fluid intake	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R69	Unknown and unspecified causes of morbidity	Excluded.	This code represents undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R79*	Other abnormal findings of blood chemistry	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
R94*	Abnormal results of function studies	All codes excluded.	These codes represent undefined or ill-specified conditions that are better represented by other more specific codes within ICD-10-AM.	N/A
S00*	Superficial injury of head	All codes excluded.	These codes capture injuries that are likely to be insignificant.	N/A
S01*	Open wound of head	Not Excluded	N/A	1.1
S06*	Intracranial injury	Code S06.00 excluded.	These codes capture injuries that are likely to be insignificant.	2.4

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ICD-10-AM 3 character code	Code block description	Exclusion Review	Rationale for exclusion	Code weighting for Frailty Risk Comorbidity Index (FRIC)
		All other codes not excluded.		
S09*	Other and unspecified injuries of head	Not Excluded	N/A	1.2
S22*	Fracture of rib(s), sternum and thoracic spine	Not Excluded	N/A	1.8
S32*	Fracture of lumbar spine and pelvis	Not Excluded	N/A	1.4
S42*	Fracture of shoulder and upper arm	Not Excluded	N/A	2.3
S51*	Open wound of forearm	Not Excluded	N/A	0.5
S72*	Fracture of femur	Not Excluded	N/A	1.4
S80*	Superficial injury of lower leg	All codes excluded.	These codes capture injuries that are likely to be insignificant.	N/A
T83*	Complications of genitourinary prosthetic devices, implants and grafts	Not Excluded	N/A	2.4
W01*	Fall on same level from slipping, tripping and stumbling	All codes excluded.	These codes provide specificity around the details of the fall or exposure factor, and are coded in addition to the injury sustained.	N/A
W06*	Fall involving bed	All codes excluded.	These codes provide specificity around the details of the fall or exposure factor, and are coded in addition to the injury sustained.	N/A
W10*	Fall on and from stairs and steps	All codes excluded.	These codes provide specificity around the details of the fall or exposure factor, and are coded in addition to the injury sustained.	N/A
W18*	Other fall on same level	All codes excluded.	These codes provide specificity around the details of the fall or exposure factor, and are coded in addition to the injury sustained.	N/A
W19	Unspecified fall	Excluded.	This code provides specificity around the details of the fall or exposure factor, and is coded in addition to the injury sustained.	N/A
X59	Exposure to unspecified factor	Excluded.	This code provides specificity around the details of the fall or exposure factor, and is coded in addition to the injury sustained.	N/A
Y84*	Other medical procedures as the cause of abnormal reaction, or of later complication, without mention of unintentional events at the time of the procedure	All codes excluded.	These codes provide specificity around the details of the complication, and are coded in addition to the complication or condition.	N/A
Y95	Nosocomial condition	Excluded.	This code provides specificity around the details of the complication, and is coded in	N/A

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ICD-10-AM 3 character code	Code block description	Exclusion Review	Rationale for exclusion	Code weighting for Frailty Risk Comorbidity Index (FRIC)
			addition to the complication or condition.	
Z06*	Resistance to antimicrobial drugs	All codes excluded except Z06.51	As a result of the mapping from ICD-10 to ICD-10-AM only code Z06.51 was considered for inclusion in the Frailty Related Index of Comorbidities	0.8
Z22*	Carrier of infectious disease	All codes excluded.	These codes provide additional specificity to already captured conditions.	N/A
Z50*	Care involving use of rehabilitation procedures	All codes excluded.	These codes provide specificity around the details of the rehabilitation, and are coded in addition to the condition requiring rehabilitation.	N/A
Z60*	Problems related to social environment	All codes excluded.	These codes provide additional or contextual information.	N/A
Z73*	Problems related to life-management difficulty	All codes excluded.	These codes provide additional or contextual information.	N/A
Z74*	Problems related to care-provider dependency	All codes excluded.	These codes provide additional or contextual information.	N/A
Z75*	Problems related to medical facilities and other health care	All codes excluded.	These codes provide additional or contextual information.	N/A
Z87*	Personal history of other diseases and conditions	All codes excluded.	These codes provide additional or contextual information.	N/A
Z91*	Personal history of risk-factors, not elsewhere classified	All codes excluded.	These codes provide additional or contextual information.	N/A
Z93*	Artificial opening status	All codes excluded.	These codes provide additional or contextual information.	N/A
Z99*	Dependence on enabling machines and devices	All codes excluded.	These codes provide additional or contextual information.	N/A

Notes:

* means to include all the four and five character codes that fall within that three character stem, unless they have been excluded.

[1] Four diagnosis codes are excluded conditionally depending on other diagnoses assigned in the episode. Conditional exclusions have been identified for particular aetiology (dagger) and manifestation (asterisk) pairs of codes in scope for the FRIC. In these cases, the aetiology code is excluded from being assigned a FRIC score whenever the manifestation code is present as per the following Conditional Exclusion Table.

Conditional Exclusion Table

Excluded Aetiology Codes		Conditional Manifestation Codes	
G30.0	Alzheimer's disease with early onset	F00.0	Early dementia in Alzheimer's disease
G30.1	Alzheimer's disease with late onset	F00.1	Late dementia in Alzheimer's disease
G30.8	Other Alzheimer's disease	F00.2	Alzheimer's dementia atypical or mixed type
G30.9	Alzheimer's disease unspecified	F00.9	Alzheimer's dementia unspecified

Appendix E — Subacute care type definitions

Care type	Definition[25]
Rehabilitation care	Rehabilitation care is care in which the primary clinical purpose or treatment goal is improvement in the functioning of a patient with an impairment, activity limitation or participation restriction due to a health condition. The patient will be capable of actively participating. Rehabilitation care is always: • delivered under the management of or informed by a clinician with specialised expertise in rehabilitation, and • evidenced by an individualised multidisciplinary management plan, which is documented in the patient's medical record, that includes negotiated goals within specified time frames and formal assessment of functional ability. Rehabilitation care excludes care which meets the definition of mental health care.
Palliative care	Palliative care is care in which the primary clinical purpose or treatment goal is optimisation of the quality of life of a patient with an active and advanced life-limiting illness. The patient will have complex physical, psychosocial and/or spiritual needs. Palliative care is always: • delivered under the management of or informed by a clinician with specialised expertise in palliative care, and • evidenced by an individualised multidisciplinary assessment and management plan, which is documented in the patient's medical record, that covers the physical, psychological, emotional, social and spiritual needs of the patient and negotiated goals. Palliative care excludes care which meets the definition of mental health care.
Geriatric evaluation and management	Geriatric evaluation and management 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 medical conditions related to ageing, such as tendency to fall, incontinence, reduced mobility and cognitive impairment. The patient may also have complex psychosocial problems. Geriatric evaluation and management is always: • delivered under the management of or informed by a clinician with specialised expertise in geriatric evaluation and management, and • evidenced by an individualised multidisciplinary management plan, which is documented in the patient's medical record that covers the physical, psychological, emotional and social needs of the patient and includes negotiated goals within indicative time frames and formal assessment of functional ability. Geriatric evaluation and management excludes care which meets the definition of mental health care.
Psychogeriatric care	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, caused by mental illness, an 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, that covers the physical, psychological, emotional and social needs of the patient and includes negotiated goals within indicative time frames and formal assessment of functional ability. Psychogeriatric care is not applicable if the primary focus of care is acute symptom control. Psychogeriatric care excludes care which meets the definition of mental health care.

[25] See Australian Institute of Health and Welfare, **Metadata Online Data Registry (MeTeOR) identifier 711010**

Care type	Definition[25]
Non-acute care	Non-acute (or maintenance) care is care in which the primary clinical purpose or treatment goal is support for a patient with impairment, activity limitation or participation restriction due to a health condition. Following assessment or treatment the patient does not require further complex assessment or stabilisation. Patients with a care type of maintenance care often require care over an indefinite period. Maintenance care excludes care which meets the definition of mental health care.

Appendix F — Impairment-specific FIM^{TM} item weights

Table 44. Impairment group-specific FIM^{TM} item weights for admitted adult rehabilitation overnight classes

Truncated AROC impairment code	Impairment Group	FIM 1 Eating	FIM 2 Grooming	FIM 3 Bathing	FIM 4 Dressing upper body	FIM 5 Dressing lower body	FIM 6 Toileting
1	Stroke	0.967	0.994	1.107	0.864	0.972	1.076
2	Brain dysfunction	1.244	1.106	1.063	0.742	0.748	0.996
3	Neurological conditions	1.047	1.039	1.125	0.810	0.983	1.083
4	Spinal cord dysfunction	1.120	0.828	1.441	0.502	1.244	1.332
5	Amputation of limb	0.406	0.479	1.260	0.854	0.938	1.254
6	Arthritis	1.185	1.159	1.204	0.657	0.821	1.082
7	Pain syndromes	0.956	1.050	1.125	0.499	0.684	1.034
8.1	Orthopaedic - fractures	0.798	0.881	1.090	0.463	0.933	1.249
8.2	Orthopaedic post surgery	1.035	1.107	1.134	0.436	0.704	1.144
8.3	Orthopaedic soft tissue injury	1.035	1.107	1.134	0.436	0.704	1.144
9	Cardiac	0.956	1.050	1.125	0.499	0.684	1.034
10	Pulmonary	0.956	1.050	1.125	0.499	0.684	1.034
11	Burns	1.185	1.159	1.204	0.657	0.821	1.082
12	Congenital deformities	1.185	1.159	1.204	0.657	0.821	1.082
13	Other disabling impairments	1.185	1.159	1.204	0.657	0.821	1.082
14	Major multiple trauma	1.174	1.097	1.080	0.588	0.682	1.044
15	Developmental disabilities	1.185	1.159	1.204	0.657	0.821	1.082
16	Reconditioning restorative	0.809	0.894	1.121	0.563	0.857	1.145

Truncated AROC impairment code	Impairment Group	FIM 7 Bladder management	FIM 8 Bowel management	FIM 9 Transfer bed / chair / wheelchair	FIM 10 Transfer toilet	FIM 11 Transfer bath / shower	FIM 12 Locomotion	FIM 13 Stairs*
1	Stroke	0.856	0.890	1.127	1.087	1.103	0.957	1.000
2	Brain dysfunction	0.899	1.075	1.061	1.057	1.073	0.937	1.000
3	Neurological conditions	0.839	0.892	1.172	1.071	1.067	0.872	1.000
4	Spinal cord dysfunction	1.003	1.051	1.229	0.979	1.071	0.199	1.000
5	Amputation of limb	0.699	0.890	1.455	1.391	1.409	0.964	1.000
6	Arthritis	0.926	0.980	1.164	1.061	1.072	0.689	1.000
7	Pain syndromes	0.991	0.967	1.354	1.265	1.274	0.801	1.000
8.1	Orthopaedic - fractures	0.873	0.979	1.462	1.221	1.260	0.790	1.000
8.2	Orthopaedic post surgery	0.948	1.068	1.357	1.199	1.238	0.631	1.000
8.3	Orthopaedic soft tissue injury	0.948	1.068	1.357	1.199	1.238	0.631	1.000
9	Cardiac	0.991	0.967	1.354	1.265	1.274	0.801	1.000
10	Pulmonary	0.991	0.967	1.354	1.265	1.274	0.801	1.000
11	Burns	0.926	0.980	1.164	1.061	1.072	0.689	1.000
12	Congenital deformities	0.926	0.980	1.164	1.061	1.072	0.689	1.000
13	Other disabling impairments	0.926	0.980	1.164	1.061	1.072	0.689	1.000
14	Major multiple trauma	1.039	1.184	1.106	1.090	1.088	0.829	1.000
15	Developmental disabilities	0.926	0.980	1.164	1.061	1.072	0.689	1.000
16	Reconditioning restorative	0.838	0.886	1.385	1.292	1.297	0.913	1.000

Notes: FIM13 (Stairs) unweighted in AN-SNAP V5 due to the majority of episodes across various impairments groups having a FIM13 (stairs) score of 1 (for example, 94.74% of episodes within Amputation of limb have a FIM13 (stairs) score of 1).

Weighted FIM^{TM} Motor Groups

AN-SNAP V5 retains the same groups established in AN-SNAP V4 to ensure adequate episodes for the FIM^{TM} Motor weight calculation. Impairments that are grouped together in the classification adopted the same FIM^{TM} Motor weights. The impairment types are outlined in Table 3 and are categorised within the following groupings:

Group 1	Arthritis, burns, congenital deformities, other disabling impairments and developmental disabilities
Group 2	Pain syndromes, cardiac and pulmonary
Group 3	Orthopaedic fractures, post-surgery and soft tissue injury
All other impairment types were treated independently due to a sufficient volume of episodes used to determine the FIM Motor weights.	

Group 1 captures the impairment groups with low episode volume to obtain a meaningful set of FIM Motor weights. Group 2 was developed after a clinical subgroup recommendation of combining Pain, cardiac and pulmonary impairment types into a single class in AN-SNAP V4. This recommendation was supported by subsequent statistical analysis. Group 3 captures all the orthopaedic impairment types due to the clinical similarity of treatment and conditions.

Appendix G — AN-SNAP V5 end classes

Table 45: AN-SNAP V5 admitted branch end classes, number of episodes, average cost, average length-of-stay and coefficient of variation

End-class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
Rehabilitation Care							
Low WFIM – Brain, spine, major multiple trauma (MMT), burns							
5AZ1	Weighted FIM Motor score 13-18	Brain, spine, MMT, burns	Age >= 59	656	$47,679	37.39	1.11
5AZ2	Weighted FIM Motor score 13-18	Brain, spine, MMT, burns	Age 18 - 58	664	$71,380	50.40	1.12
Low WFIM – All other impairment types							
5AZ3	Weighted FIM Motor score 13-18	All other impairments	Age >= 79	3,682	$24,205	22.36	0.92
5AZ4	Weighted FIM Motor score 13-18	All other impairments	Age 18 - 78	3,788	$35,742	31.09	1.06
Stroke							
5AA1	Stroke	Weighted FIM Motor 63 - 91	FIM Cognition 30 - 35	3,025	$11,100	10.65	0.78
5AA2	Stroke	Weighted FIM Motor 63 - 91	FIM Cognition 21 - 29	2,464	$14,999	13.96	0.79
5AA3	Stroke	Weighted FIM Motor 63 - 91	FIM Cognition 5 - 20	1,015	$22,258	19.93	0.77
5AA4	Stroke	Weighted FIM Motor 44 - 62	FIM Cognition 18 - 35	4,818	$19,000	17.75	0.76
5AA5	Stroke	Weighted FIM Motor 44 - 62	FIM Cognition 5 - 17	1,252	$26,865	25.22	0.75
5AA6	Stroke	Weighted FIM Motor 19 - 43	Age >= 80	2,616	$28,022	26.59	0.75
5AA7	Stroke	Weighted FIM Motor 19 - 43	Age 67 - 79	2,331	$34,177	30.78	0.80
5AA8	Stroke	Weighted FIM Motor 19 - 43	Age 18 - 66	1,641	$44,989	38.35	0.86
Brain dysfunction							
5AB1	Brain dysfunction	FIM Cognition 27 - 35	Weighted FIM Motor 59 - 91	1,398	$13,731	12.05	0.97
5AB2	Brain dysfunction	FIM Cognition 27 - 35	Weighted FIM Motor 19 - 58	704	$20,923	18.12	0.95
5AB3	Brain dysfunction	FIM Cognition 19 - 26	Weighted FIM Motor 50 - 91	1,395	$19,370	16.18	0.90
5AB4	Brain dysfunction	FIM Cognition 19 - 26	Weighted FIM Motor 19 - 49	605	$28,280	23.82	1.03
5AB5	Brain dysfunction	FIM Cognition 5 - 18	Weighted FIM Motor 39 - 91	1,126	$31,740	25.42	1.00

End-class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
5AB6	Brain dysfunction	FIM Cognition 5 - 18	Weighted FIM Motor 19 - 38	624	$39,528	32.54	1.21
Neurological Conditions							
5AC1	Neurological conditions	Weighted FIM Motor 70 - 91		1,476	$11,977	11.74	0.76
5AC2	Neurological conditions	Weighted FIM Motor 50 - 69		2,643	$16,346	16.26	0.80
5AC3	Neurological conditions	Weighted FIM Motor 19 - 49		2,601	$24,673	23.85	0.91
Spinal cord dysfunction							
5AD1	Spinal cord dysfunction	Weighted FIM Motor 55 - 91		826	$25,669	21.69	1.13
5AD2	Spinal cord dysfunction	Weighted FIM Motor 37 - 54		649	$39,101	32.79	0.97
5AD3	Spinal cord dysfunction	Weighted FIM Motor 19 - 36		934	$55,288	42.60	0.99
Amputation of Limb							
5AE1	Amputation of limb			3,915	$23,467	22.15	0.93
Orthopaedic conditions, fractures							
5AH1	Orthopaedic conditions, fractures	Weighted FIM Motor 48 - 91	FIM Cognition 33 - 35	7,381	$12,439	12.85	0.82
5AH2	Orthopaedic conditions, fractures	Weighted FIM Motor 48 - 91	FIM Cognition 21 - 32	7,515	$14,564	15.61	0.68
5AH3	Orthopaedic conditions, fractures	Weighted FIM Motor 48 - 91	FIM Cognition 5 - 20	2,725	$18,260	20.50	0.66
5AH4	Orthopaedic conditions, fractures	Weighted FIM Motor 19 - 47		13,589	$19,796	20.20	0.77
Orthopaedic conditions, replacement (knee, hip, shoulder) group							
5A41	Orthopaedic conditions, replacement (knee, hip, shoulder)	Weighted FIM Motor 61 - 91		7,680	$8,469	9.41	0.67
5A42	Orthopaedic conditions, replacement (knee, hip, shoulder)	Weighted FIM Motor 45 - 60		5,486	$10,924	11.78	0.69
5A43	Orthopaedic conditions, replacement (knee, hip, shoulder)	Weighted FIM Motor 19 - 44		2,381	$15,562	16.33	0.79
Orthopaedic conditions, All Other group							
5A21	Orthopaedic conditions, all other	Weighted FIM Motor 57 - 91		3,018	$11,151	12.05	0.75
5A22	Orthopaedic conditions, all other	Weighted FIM Motor 41 - 56		1,693	$15,951	16.22	0.78

End-class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
5A23	Orthopaedic conditions, all other	Weighted FIM Motor 19 - 40		952	$21,510	21.46	0.78
Cardiac, pain syndromes, and pulmonary							
5A31	Cardiac, pain syndromes, and pulmonary	Weighted FIM Motor 66 - 91		4,168	$9,881	10.61	0.74
5A32	Cardiac, pain syndromes, and pulmonary	Weighted FIM Motor 38 - 65		6,246	$13,304	14.10	0.73
5A33	Cardiac, pain syndromes, and pulmonary	Weighted FIM Motor 19 - 37		1,273	$18,445	18.40	0.80
Major multiple trauma							
5AP1	Major multiple trauma	Weighted FIM Motor 51 - 91		684	$21,873	18.20	1.04
5AP2	Major multiple trauma	weighted FIM Motor 19 - 50		456	$36,423	27.73	1.14
Reconditioning							
5AR1	Reconditioning	Weighted FIM Motor 64 - 91	FIM Cognition 29 - 35	6,744	$10,606	10.79	0.78
5AR2	Reconditioning	Weighted FIM Motor 64 - 91	FIM Cognition 5 - 28	3,654	$13,038	13.36	0.77
5AR3	Reconditioning	Weighted FIM Motor 48 - 63	FIM Cognition 19 - 35	12,065	$13,962	13.70	0.75
5AR4	Reconditioning	Weighted FIM Motor 48 - 63	FIM Cognition 5 - 18	1,947	$17,566	17.68	0.75
5AR5	Reconditioning	Weighted FIM Motor 19 - 47		13,063	$19,228	17.96	0.83
All other impairment types group							
5A91	All other impairments	Weighted FIM Motor 61 - 91		1,070	$12,497	11.80	0.84
5A92	All other impairments	Weighted FIM Motor 42 - 60		935	$17,113	16.05	0.82
5A93	All other impairments	Weighted FIM Motor 19 - 41		631	$22,981	20.01	1.10
Same day rehabilitation							
5J01	Adult same-day rehabilitation			78,289	$545	1.00	0.79
Paediatric rehabilitation							
5F01	Rehabilitation	Age <= 3		127	$46,681	17.46	1.01
5F02	Rehabilitation	Age >= 4	Spinal cord dysfunction	120	$55,808	30.50	1.17
5F03	Rehabilitation	Age >= 4	Brain dysfunction	350	$54,165	24.27	1.28
5F04	Rehabilitation	Age >= 4	Neurological conditions	212	$24,442	12.30	1.24
5F05	Rehabilitation	Age >= 4	All other impairments	297	$30,888	14.61	1.21

End-class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
5O01	Paediatric same-day rehabilitation			2,751	$2,997	1.00	0.47
Palliative care							
Adult palliative care							
5BS1	Stable phase	RUG-ADL 4-5		7,988	$9,670	6.40	1.20
5BS2	Stable phase	RUG-ADL 6-16		17,075	$10,670	7.28	1.25
5BS3	Stable phase	RUG-ADL 17-18		6,480	$10,051	7.14	1.37
5BU1	Unstable phase	First Phase in Episode	RUG-ADL 4-13	14,270	$5,906	3.55	1.59
5BU2	Unstable phase	First Phase in Episode	RUG-ADL 14-18	9,273	$4,533	3.15	1.67
5UB3	Unstable phase	Not first Phase in Episode	RUG-ADL 4-5	1,317	$5,933	2.32	1.70
5UB4	Unstable phase	Not first Phase in Episode	RUG-ADL 6-18	6,195	$5,425	2.16	2.02
5BD1	Deteriorating phase	RUG-ADL 4-14		16,546	$9,057	5.63	1.30
5BD2	Deteriorating phase	RUG-ADL 15-18	Age >= 75	13,786	$6,188	4.20	1.38
5BD3	Deteriorating phase	RUG-ADL 15-18	Age 55-74	8,128	$7,610	4.58	1.49
5BD4	Deteriorating phase	RUG-ADL 15-18	Age <= 54	1,650	$9,041	5.46	1.52
5BT1	Terminal phase			32,500	$4,911	2.52	1.42
5K01	Adult same-day palliative care			3,808	$917	1.01	0.94
Paediatric palliative care							
5G01	Phase Type: Not Terminal	Age < 1 year		56	$34,269	10.02	1.15
5G02	Phase Type: Not Terminal	Age >= 1 year	Stable phase	5	$24,863	1.40	1.55
5G03	Phase Type: Not Terminal	Age >= 1 year	Unstable or Deteriorating phase	221	$28,069	8.10	1.72
5G04	Terminal phase			40	$15,974	4.40	0.94
5P01	Paediatric same-day palliative care			35	$1,961	1.00	0.48
Geriatric evaluation and management (GEM)							
5CL1	Frailty 0 - 1.8	FIM Motor 58 - 91		10,555	$9,982	11.52	0.86
5CL2	Frailty 0 - 1.8	FIM Motor 13 - 57		16,250	$13,474	15.06	0.84
5CM1	Frailty 1.9 - 7.3	FIM Motor 51 - 91		16,266	$13,390	14.72	0.88
5CM2	Frailty 1.9 - 7.3	FIM Motor 13 - 50		23,628	$17,305	18.93	0.81
5CH1	Frailty >= 7.4	FIM Motor 40 - 91		6,823	$18,829	19.93	0.84

End-class for V5	Description and thresholds for V5			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
5CH2	Frailty >= 7.4	FIM Motor 13 - 39		8,563	$22,757	23.79	0.80
5L01	Same-Day GEM			499	$671	1.00	1.09
Psychogeriatric							
5DL1	Long-term care (LOS > 91 days)			87	$185,838	131.66	0.58
5DS1	LOS =< 91 days	HoNOS 65+ Total 18 - 48		1,351	$26,599	19.37	1.11
5DS2	LOS =< 91 days	HoNOS 65+ Total 0 - 17		1,493	$33,258	21.95	1.06
5M01	Same-day psychogeriatric care			85	$778	1.00	0.5
Non-acute							
5EL1	Long-term care (LOS > 91 days)			586	$142,717	132.97	0.55
5ES1	Shorter term care LOS =< 91 days	Age >= 65	Frailty 0 - 1.9	17,981	$9,592	9.62	1.12
5ES2	Shorter term care LOS =< 91 days	Age >= 65	Frailty >= 2	26,723	$13,398	13.02	1.08
5ES3	Shorter term care LOS =< 91 days	Age = 18-64		7,365	$16,006	13.64	1.29
5ES4	Shorter term care LOS =< 91 days	Age =< 17		133	$20,562	10.77	1.48

Appendix H — AN-SNAP V4 end classes

Table 46: AN-SNAP V4 admitted branch end classes, number of episodes, average cost, average length-of-stay and coefficient of variation

End class for V4	Description and thresholds for V4			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
Rehabilitation Care							
Low WFIM – Brain, spine, major multiple trauma (MMT)							
4AZ1	Weighted FIM Motor score 13 – 18	Brain, spine, MMT	Age >= 49	825	$53,609	40.57	1.18
4AZ2	Weighted FIM Motor score 13 – 18	Brain, Spine, MMT	Age <= 48	457	$69,276	48.39	1.10
Low WFIM – All other impairment types							
4AZ3	Weighted FIM Motor score 13 – 18	All other impairments	Age >= 65	5,604	$27,641	24.97	0.94
4AZ4	Weighted FIM Motor score 13 - 18	All other impairments	Age <= 64	1,414	$41,768	35.37	1.17
Stroke							
4AA1	Stroke	Weighted FIM Motor 51 - 91	FIM Cognition 29 - 35	4,924	$12,957	12.24	0.80
4AA2	Stroke	Weighted FIM Motor 51 - 91	FIM Cognition 19 - 28	4,328	$17,094	16.03	0.76
4AA3	Stroke	Weighted FIM Motor 51 - 91	FIM Cognition 5 - 18	1,599	$24,748	22.78	0.74
4AA4	Stroke	Weighted FIM Motor 36 - 50	Age >= 68	2,739	$24,591	23.23	0.75
4AA5	Stroke	Weighted FIM Motor 36 - 50	Age <= 67	1,000	$32,881	28.62	0.86
4AA6	Stroke	Weighted FIM Motor 19 - 35	Age >= 68	3,334	$32,624	29.90	0.80
4AA7	Stroke	Weighted FIM Motor 19 - 35	Age <= 67	1,240	$47,454	40.52	0.85
Brain dysfunction							
4AB1	Brain dysfunction	Weighted FIM Motor 71-91	FIM Cognition 26-35	1,057	$13,319	11.39	0.94
4AB2	Brain dysfunction	Weighted FIM Motor 71-91	FIM Cognition 5-25	856	$24,835	18.73	1.03
4AB3	Brain dysfunction	Weighted FIM Motor 41-70	FIM Cognition 26-35	1,079	$17,725	15.72	1.11
4AB4	Brain dysfunction	Weighted FIM Motor 41-70	FIM Cognition 17-25	1,107	$22,485	19.58	0.93
4AB5	Brain dysfunction	Weighted FIM Motor 41-70	FIM Cognition 5-16	588	$32,861	26.81	1.02
4AB6	Brain dysfunction	Weighted FIM Motor 29-40		683	$31,375	26.33	1.04
4AB7	Brain dysfunction	Weighted FIM Motor 19-28		539	$39,194	32.55	1.25

End class for V4	Description and thresholds for V4			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
Neurological conditions							
4AC1	Neurological conditions	Weighted FIM Motor 62-91		2,707	$13,529	13.33	0.78
4AC2	Neurological conditions	Weighted FIM Motor 43-61		2,236	$18,842	18.47	0.85
4AC3	Neurological conditions	Weighted FIM Motor 19-42		1,789	$25,990	25.21	0.92
Spinal cord dysfunction							
4AD1	Spinal cord dysfunction	Age >= 50	Weighted FIM Motor 42-91	876	$28,491	24.46	1.12
4AD2	Spinal cord dysfunction	Age >= 50	Weighted FIM Motor 19-41	784	$49,130	39.80	1.02
4AD3	Spinal cord dysfunction	Age <= 49	Weighted FIM Motor 34-91	497	$39,235	30.80	1.07
4AD4	Spinal cord dysfunction	Age <= 49	Weighted FIM Motor 19-33	228	$61,657	44.56	0.91
Amputation of limb							
4AE1	Amputation of limb	Age >= 54	Weighted FIM Motor 68-91	300	$17,999	17.28	0.95
4AE2	Amputation of limb	Age >= 54	Weighted FIM Motor 31-67	2,366	$24,217	23.16	0.92
4AE3	Amputation of limb	Age >= 54	Weighted FIM Motor 19-30	533	$26,306	24.85	0.95
4AE4	Amputation of limb	Age <= 53	Weighted FIM Motor 19-91	782	$22,306	19.95	0.93
Orthopaedic conditions, fractures							
4AH1	Orthopaedic conditions, fractures	Weighted FIM Motor 49-91	FIM Cognition 33-35	7,490	$12,527	12.93	0.82
4AH2	Orthopaedic conditions, fractures	Weighted FIM Motor 49-91	FIM Cognition 5-32	10,430	$15,601	16.97	0.69
4AH3	Orthopaedic conditions, fractures	Weighted FIM Motor 38-48		6,173	$18,416	19.03	0.75
4AH4	Orthopaedic conditions, fractures	Weighted FIM Motor 19-37		7,318	$21,127	21.28	0.78
Orthopaedic conditions, all other							
4A21	Orthopaedic conditions, all other (including replacements)	Weighted FIM Motor 68-91		6,591	$8,684	9.71	0.73
4A22	Orthopaedic conditions, all other (including replacements)	Weighted FIM Motor 50-67		9,393	$11,015	11.83	0.72
4A23	Orthopaedic conditions, all other (including replacements)	Weighted FIM Motor 19-49		5,246	$15,815	16.30	0.83

End class for V4	Description and thresholds for V4			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
Cardiac, pain syndromes, and pulmonary							
4A31	Cardiac, pain syndromes, and pulmonary	Weighted FIM Motor 72-91		2,991	$9,541	10.29	0.73
4A32	Cardiac, pain syndromes, and pulmonary	Weighted FIM Motor 55-71		4,660	$11,959	12.90	0.72
4A33	Cardiac, pain syndromes, and pulmonary	Weighted FIM Motor 34-54		3,132	$14,914	15.34	0.76
4A34	Cardiac, pain syndromes, and pulmonary	Weighted FIM Motor 19-33		901	$18,568	18.60	0.80
Major multiple trauma							
4AP1	Major multiple trauma	Weighted FIM Motor 19-91		1,136	$27,657	21.97	1.17
Reconditioning							
4AR1	Reconditioning	Weighted FIM Motor 67-91		9,464	$11,379	11.63	0.79
4AR2	Reconditioning	Weighted FIM Motor 50-66	FIM Cognition 26-35	8,594	$13,646	13.21	0.78
4AR3	Reconditioning	Weighted FIM Motor 50-66	FIM Cognition 5-25	5,946	$15,309	15.44	0.74
4AR4	Reconditioning	Weighted FIM Motor 34-49	FIM Cognition 31-35	2,066	$17,604	15.95	0.84
4AR5	Reconditioning	Weighted FIM Motor 34-49	FIM Cognition 5-30	6,725	$17,776	17.06	0.76
4AR6	Reconditioning	Weighted FIM Motor 19-33		4,863	$21,741	19.93	0.87
All other impairment types							
4A91	All other impairments	Weighted FIM Motor 55-91		1,373	$13,431	12.72	0.85
4A92	All other impairments	Weighted FIM Motor 33-54		872	$18,535	17.13	0.89
4A93	All other impairments	Weighted FIM Motor 19-32		369	$23,580	19.95	1.18
Same day rehabilitation							
4J01	Adult same-day rehabilitation			78,289	$545	1.00	0.79
Paediatric rehabilitation							
4F01	Rehabilitation	Age <= 3		127	$46,681	17.46	1.01
4F02	Rehabilitation	Age >= 4	Spinal cord dysfunction	120	$55,808	30.50	1.17
4F03	Rehabilitation	Age >= 4	Brain dysfunction	350	$54,165	24.27	1.28
4F04	Rehabilitation	Age >= 4	Neurological conditions	212	$24,442	12.30	1.24
4F05	Rehabilitation	Age >= 4	All other impairments	297	$30,888	14.61	1.21
4O01	Paediatric same-day rehabilitation			2,751	$2,997	1.00	0.47

End class for V4	Description and thresholds for V4			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
Palliative care							
Adult palliative care							
4BS1	Stable phase	RUG-ADL 4-5		7,988	$9,670	6.40	1.20
4BS2	Stable phase	RUG-ADL 6-16		17,075	$10,670	7.28	1.25
4BS3	Stable phase	RUG-ADL 17-18		6,480	$10,051	7.14	1.37
4BU1	Unstable phase	First Phase in Episode	RUG-ADL 4-13	14,270	$5,906	3.55	1.59
4BU2	Unstable phase	First Phase in Episode	RUG-ADL 14-18	9,273	$4,533	3.15	1.67
4BU3	Unstable phase	Not first Phase in Episode	RUG-ADL 4-5	1,317	$5,933	2.32	1.70
4BU4	Unstable phase	Not first Phase in Episode	RUG-ADL 6-18	6,195	$5,425	2.16	2.02
4BD1	Deteriorating phase	RUG-ADL 4-14		16,546	$9,057	5.63	1.30
4BD2	Deteriorating phase	RUG-ADL 15-18	Age >= 75	13,786	$6,188	4.20	1.38
4BD3	Deteriorating phase	RUG-ADL 15-18	Age 55-74	8,128	$7,610	4.58	1.49
4BD4	Deteriorating phase,	RUG-ADL 15-18	Age <= 54	1,650	$9,041	5.46	1.52
4BT4	Terminal phase			32,500	$4,911	2.52	1.42
4K01	Adult same-day palliative care			3,808	$917	1.01	0.94
Paediatric palliative care							
4G01	Phase Type: Not Terminal	Age < 1 year		56	$34,269	10.02	1.15
4G02	Phase Type: Not Terminal	Age >= 1 year	Stable phase	5	$24,863	1.40	1.55
4G03	Phase Type: Not Terminal	Age >= 1 year	Unstable or Deteriorating phase	221	$28,069	8.10	1.72
4G04	Terminal phase			40	$15,974	4.40	0.94
4P01	Paediatric same-day palliative care			35	$1,961	1.00	0.48
Geriatric evaluation and management (GEM)							
4CH1	FIM Motor 57-91	With Delirium or Dementia		5,817	$15,439	16.65	0.99
4CH2	FIM Motor 57-91	Without Delirium or Dementia		19,011	$11,009	12.46	0.84
4CL1	FIM Motor 13-17	With Delirium or Dementia		3,682	$19,463	20.66	0.87
4CL2	FIM Motor 13-17	Without Delirium or Dementia		3,243	$17,346	18.73	1.04
4CM1	FIM Motor 18-56	With Delirium or Dementia		17,030	$18,531	19.91	0.83

End class for V4	Description and thresholds for V4			Episodes	Average cost	Average length of stay	Coefficient of variation (CoV)
4CM2	FIM Motor 18-56	Without Delirium or Dementia		33,302	$15,967	17.51	0.82
4L01	Same-Day GEM			499	$671	1.00	1.09
Psychogeriatric							
4DL1	Long term care			87	$185,838	131.66	0.58
4DS1	HoNOS 65+ Overactive behaviour 3-4	LOS <= 91		1,280	$28,293	20.16	1.14
4DS2	HoNOS 65+ Overactive behaviour 1-2	HoNOS 65+ ADL 4	LOS <= 91	104	$27,450	19.81	0.91
4DS3	HoNOS 65+ Overactive behaviour 1-2	HoNOS 65+ ADL 0-3	LOS <= 91	836	$33,527	22.53	1.02
4DS4	HoNOS 65+ Overactive behaviour 0	HoNOS 65+ total 18-48	LOS <= 91	95	$30,876	20.87	1.26
4DS5	HoNOS 65+ Overactive behaviour 0	HoNOS 65+ total 0-17	LOS <= 91	529	$29,407	19.38	1.10
4M01	Same- day psychogeriatric care			85	$778	1.00	0.50
Non-Acute							
4EL1	Long term care (LoS > 91)			586	$142,717	132.97	0.55
4ES1	Short term care (LoS<=91)	Age >= 60	RUG - ADL 4-11	30,699	$11,664	11.40	1.17
4ES2	Short term care (LoS<=91)	Age >= 60	RUG - ADL 12-15	8,526	$12,289	12.13	1.07
4ES3	Short term care (LoS<=91)	Age >= 60	RUG - ADL 16-18	7,602	$13,154	12.61	1.10
4ES4	Short term care (LoS<=91)	Age = 18 - 59		5,242	$16,324	13.75	1.27
4ES5	Short term care (LoS<=91)	Age <= 17		133	$20,562	10.77	1.48

Appendix I — AN-SNAP V5 four character end-class labelling system

Item	Information coded	Codes Char 1	Codes Char 2	Codes Char 3	Codes Char 4	Description
Character 1						
AN-SNAP Version		5				Version number

Item	Information coded	Codes Char 1	Codes Char 2	Codes Char 3	Codes Char 4	Description
Character 2						
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

Item	Information coded	Codes Char 1	Codes Char 2	Codes Char 3	Codes Char 4	Description
Character 3						
Adult rehabilitation classes	Low function			Z		Weighted FIM™ Motor 13 - 18
	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 – All 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 – All Other
				3		Cardiac, pain syndromes and pulmonary
				4		Orthopaedic conditions – Replacement (Hip, Knee, Shoulder)
				9		All other impairments
	Assessment only			Y		Assessment only
Adult palliative care classes	Palliative care phase			S		Stable phase
				U		Unstable phase
				D		Deteriorating phase
				T		Terminal phase
Paediatric classes	NA			O		NA
Admitted GEM classes	Frailty Related Comorbidity Index (FRIC)			L		FRIC ≥ 7.4 (**L**ow functioning)
				M		FRIC 1.9 -7.3 (**M**id functioning)
				H		FRIC 0 – 1.8 (**H**igh functioning)
Non-admitted GEM classes	Clinic type			C		Clinic Type
Admitted psychogeriatric and non-acute classes	Length of stay (LoS)			L		LoS ≥ 92 days
				S		LoS ≤ 91 days

Non-admitted psychogeriatric classes	Focus of care		A		Acute
			N		Non-acute
Same day classes	NA		O		NA
Error classes	Ungroupable		9		Grouping variable missing

Character 4				
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 or Care Type

AN-SNAP V5 error classes

Adult error classes

Class	Admitted
Rehabilitation	599A
Palliative care	599B
GEM	599C
Psychogeriatric	599D
Non-acute	599E

Paediatric error classes

Class	Admitted
Rehabilitation	599F
Palliative care	599G

All other ungroupable

Class	Description
5999	Occurs when there is an error with episode type or care type