Independent Hospital Pricing Authority

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

Final Report

**December 2021**

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

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# Contents

[Acronyms and abbreviations 7](#_Toc88819271)

[1 Executive summary 8](#_Toc88819272)

[2 Introduction 10](#_Toc88819273)

[2.1 Subacute care and AN-SNAP 10](#_Toc88819274)

[2.2 Overview of AN-SNAP V4 10](#_Toc88819275)

[3 Developing AN-SNAP V5 12](#_Toc88819276)

[3.1 Objectives and overview 12](#_Toc88819277)

[3.2 Governance and consultation 12](#_Toc88819278)

[3.3 Decision principles 13](#_Toc88819279)

[3.4 Data 13](#_Toc88819280)

[3.4.1 Data preparation 14](#_Toc88819281)

[3.5 Optimising the existing AN-SNAP variables 16](#_Toc88819282)

[3.5.1 The benchmark AN-SNAP V4 statistical performance 16](#_Toc88819283)

[3.5.2 Method 17](#_Toc88819284)

[3.5.3 Summary of the outcome 17](#_Toc88819285)

[3.6 Exploring potential new variables 17](#_Toc88819286)

[3.6.1 Method 17](#_Toc88819287)

[3.6.2 Patient frailty 18](#_Toc88819288)

[4 The AN-SNAP V5 classification 26](#_Toc88819289)

[4.1 Overview 26](#_Toc88819290)

[4.1.1 Admitted and non-admitted care 28](#_Toc88819291)

[4.1.2 Five care types 28](#_Toc88819292)

[4.1.3 Functional Independence Measure Motor weights 28](#_Toc88819293)

[4.2 The AN-SNAP V5 admitted classes 29](#_Toc88819294)

[4.2.1 Admitted adult rehabilitation classes 30](#_Toc88819295)

[4.2.2 Admitted paediatric rehabilitation classes 40](#_Toc88819296)

[4.2.3 Admitted adult palliative care classes 41](#_Toc88819297)

[4.2.4 Admitted paediatric palliative care classes 43](#_Toc88819298)

[4.2.5 Admitted geriatric evaluation and management classes 43](#_Toc88819299)

[4.2.6 Admitted psychogeriatric classes 47](#_Toc88819300)

[4.2.7 Admitted non-acute classes 48](#_Toc88819301)

[5 Statistical performance of the AN-SNAP V5 model 50](#_Toc88819302)

[5.1.1 End class characteristics 51](#_Toc88819303)

[6 AN-SNAP V5 class naming convention 52](#_Toc88819304)

[7 Future work 53](#_Toc88819305)

[7.1.1 Rockwood Clinical Frailty Scale 53](#_Toc88819306)

[7.1.2 WeeFIMTM 53](#_Toc88819307)

[Appendix A — Subacute Care Working Group 54](#_Toc88819308)

[Appendix B — Public consultation submissions 55](#_Toc88819309)

[Appendix C — Method to explore potential new variables 56](#_Toc88819310)

[Appendix D — Incorporating a measure related to frailty 59](#_Toc88819311)

[Appendix E — Subacute care type definitions 69](#_Toc88819312)

[Appendix F — Impairment-specific FIMTM item weights 71](#_Toc88819313)

[Appendix G — AN-SNAP V5 end classes 74](#_Toc88819314)

[Appendix H — AN-SNAP V4 end classes 79](#_Toc88819315)

[Appendix I — AN-SNAP V5 four character end-class labelling system 84](#_Toc88819316)

#### List of tables

[Table 1. AN-SNAP V4 variables 11](#_Toc88819317)

[Table 2. Classification development decision principles 13](#_Toc88819318)

[Table 3. Comparing volume and coverage of episode records available for analysis for AN-SNAP V4 and AN-SNAP V5. 14](#_Toc88819319)

[Table 4. Data preparation - trimming criteria 15](#_Toc88819320)

[Table 5: Number of episodes trimmed at each data preparation stage for statistical analysis 15](#_Toc88819321)

[Table 6. AN-SNAP V4 statistical performance (Reduction in Deviance) by care type 16](#_Toc88819322)

[Table 7. Decision criteria for split threshold simulations 18](#_Toc88819323)

[Table 8. ICD-10-AM codes used to calculate the Frailty Related Index of Comorbidities (FRIC) 20](#_Toc88819324)

[Table 9. Comparing AN-SNAP V4 and AN-SNAP V5 26](#_Toc88819325)

[Table 10. Adult rehabilitation - Same-day class 31](#_Toc88819326)

[Table 11. Higher complexity classes (low WFIMTM Motor score 13 - 18) 31](#_Toc88819327)

[Table 12. High complexity episodes (low WFIMTM Motor score) - Impairment type cost profile 32](#_Toc88819328)

[Table 13. Adult rehabilitation - Stroke impairment classes 33](#_Toc88819329)

[Table 14. Adult rehabilitation - Brain dysfunction classes 33](#_Toc88819330)

[Table 15. Adult rehabilitation - Neurological condition classes 34](#_Toc88819331)

[Table 16. Adult rehabilitation - Spinal cord dysfunction classes 35](#_Toc88819332)

[Table 17. Adult rehabilitation - Amputation of limb class 35](#_Toc88819333)

[Table 18. Adult rehabilitation - Orthopaedic conditions, fractures classes 35](#_Toc88819334)

[Table 19. Adult rehabilitation - Orthopaedic conditions, replacement classes (new group) 36](#_Toc88819335)

[Table 20. AROC codes for Orthopaedic conditions, replacement and orthopaedic conditions, all other*s* 36](#_Toc88819336)

[Table 21. Orthopaedic conditions, replacement episode characteristics 37](#_Toc88819337)

[Table 22. Adult rehabilitation - Orthopaedic conditions, all other group classes 38](#_Toc88819338)

[Table 23. Adult rehabilitation - Cardiac, pain syndromes, and pulmonary group classes 38](#_Toc88819339)

[Table 24. Adult rehabilitation - Major multiple trauma classes 38](#_Toc88819340)

[Table 25. Adult rehabilitation - Reconditioning classes 39](#_Toc88819341)

[Table 26. Adult rehabilitation - All other impairments group classes 40](#_Toc88819342)

[Table 27. Paediatric rehabilitation classes 41](#_Toc88819343)

[Table 28. Adult palliative care - Same-day class 42](#_Toc88819344)

[Table 29. Adult palliative care - Overnight classes 42](#_Toc88819345)

[Table 30. Paediatric palliative care classes 43](#_Toc88819346)

[Table 31. Geriatric evaluation and management - Same-day class 44](#_Toc88819347)

[Table 32. Geriatric evaluation and management - Overnight classes 44](#_Toc88819348)

[Table 33. RID performance of overnight classes for GEM care type – V4 vs V5 45](#_Toc88819349)

[Table 34. Frailty Related Comorbidity Index with weighting points >= 2.0 46](#_Toc88819350)

[Table 35. Psychogeriatric care - Same-day class 47](#_Toc88819351)

[Table 36. Psychogeriatric care - Overnight classes 47](#_Toc88819352)

[Table 37. Non-acute care - Overnight classes 49](#_Toc88819353)

[Table 38. Statistical performance of AN-SNAP V5 compared to AN-SNAP V4 for subacute episodes by care type 51](#_Toc88819354)

[Table 39. AN-SNAP V5 class naming convention summary 52](#_Toc88819355)

[Table 40. Independent Hospital Pricing Authority - Subacute Care Working Group 54](#_Toc88819356)

[Table 41. AN-SNAP V5 Public Consultation Submissions 55](#_Toc88819357)

[Table 42. Decision criteria for split threshold simulations 57](#_Toc88819358)

[Table 43. Adapting the Hospital Frailty Risk Score for activity based funding purposes - the Exclusion Review. 61](#_Toc88819359)

[Table 44. Impairment group-specific FIMTM item weights for admitted adult rehabilitation overnight classes 71](#_Toc88819360)

[Table 45: AN-SNAP V5 admitted branch end classes, number of episodes, average cost, average length-of-stay and coefficient of variation 74](#_Toc88819361)

[Table 46: AN-SNAP V4 admitted branch end classes, number of episodes, average cost, average length-of-stay and coefficient of variation 79](#_Toc88819362)

#### List of figures

[Figure 1. Method to assess new variables for AN-SNAP V5 18](#_Toc88819363)

[Figure 2. AN-SNAP V5 Structure 29](#_Toc88819364)

[Figure 3. Adult rehabilitation structure 30](#_Toc88819365)

[Figure 4. Paediatric rehabilitation structure 40](#_Toc88819366)

[Figure 5. Adult palliative care structure 41](#_Toc88819367)

[Figure 6. Paediatric palliative care structure 43](#_Toc88819368)

[Figure 7. Geriatric evaluation and management structure 44](#_Toc88819369)

[Figure 8. Psychogeriatric structure 47](#_Toc88819370)

[Figure 9. Non-acute structure 48](#_Toc88819371)

#### List of consultation spotlights

[Consultation spotlight #1.](#Consultationspotlight_1) 19

[Consultation spotlight #2.](#Consultationspotlight_2) 23

[Consultation spotlight #3.](#Consultationspotlight_3) 24

[Consultation spotlight #4](#Consultationspotlight_4). 37

[Consultation spotlight #5.](#Consultationspotlight_5) 46

# 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 |
| FIMTM | 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 |
| WFIMTM | Weighted Functional Independence Measure |

# 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 (FIMTM) Motor scores
* switching the order that the FIMTM sub-scores for motor and cognitive function are applied to group rehabilitation brain dysfunction episodes, that is, applying FIMTM Cognition first and then weighted FIMTM 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 FIMTM) - so it may be investigated as potential new variable classifying paediatric subacute care.

# 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).

## 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]](#footnote-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.

## 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 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 (FIMTM) Motor score (weighted)  FIMTM Cognition score  Age |
| Palliative care | Palliative care phase (stage of illness)  Resource Utilisation Groups – Activities of Daily Living (RUG-ADL) total score  Age |
| GEM | FIMTM 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.

# 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.

## 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](https://www.ihpa.gov.au/what-we-do/tier-2-non-admitted-care-services-classification), which is currently being reviewed as part of the development of a new [non-admitted care classification](https://www.ihpa.gov.au/what-we-do/non-admitted-care).

## Governance and consultation

IHPA relies on a comprehensive [committee framework](https://www.ihpa.gov.au/consultation/committees-and-working-groups) 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](#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](#APPENDIX_B)).

|  |
| --- |
| **Consultation spotlights**  All of the public consultation submissions are available at [IHPA’s website](https://www.ihpa.gov.au/past-consultations/draft-australian-national-subacute-and-non-acute-patient-classification-version). In addition, key committee and public consultation feedback (and IHPA’s response) is highlighted as ‘Consultation spotlights’ at various points throughout this report. |

## 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]](#footnote-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. |

## 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).

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 records2 | AN-SNAP V4 modelling - Number of records1 |
| 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,*](https://www.ihpa.gov.au/sites/default/files/Documents/an-snap_classification_version_4_final_report.pdf) 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.

### 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 |

## 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.

### 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]](#footnote-3)

### 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.

### 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.

## 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.

### 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.

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



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.](#_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]](#footnote-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. |

### Patient frailty

Frailty is a decline in multiple physiological systems that makes a person more vulnerable to poor outcomes from minor stressor events.[[5]](#footnote-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]](#footnote-6) Further, and most importantly 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]](#footnote-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 Scale6 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. |

#### 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]](#footnote-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
* 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).

#### 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]](#footnote-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.](#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 |
| 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 exclusion1 | 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 |
| 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 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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](#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]](#footnote-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]](#footnote-11) It includes a range of comorbid conditions including heart, liver, kidney and vascular disease, cancer, diabetes and dementia.

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.

# The AN-SNAP V5 classification

## 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]](#footnote-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 MeasureTM  (FIMTM ) Motor score – weighted (WFIMTM), FIMTM 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 WFIMTM 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 (WFIMTM Motor score thresholds; FIMTM Cognition thresholds; Age thresholds) |
|  |  |
| 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  FIMTM 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 FIMTM Motor score * Change the thresholds used for splitting variable (FIMTM 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) |

### 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.

### 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](#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]](#footnote-13)

### 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 FIMTM 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 FIMTM 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]](#footnote-14)

AN-SNAP V5 continues to use weighted FIMTM 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 FIMTM item weights for admitted adult rehabilitation overnight classes are detailed at [Appendix F](#APPENDIX_F).

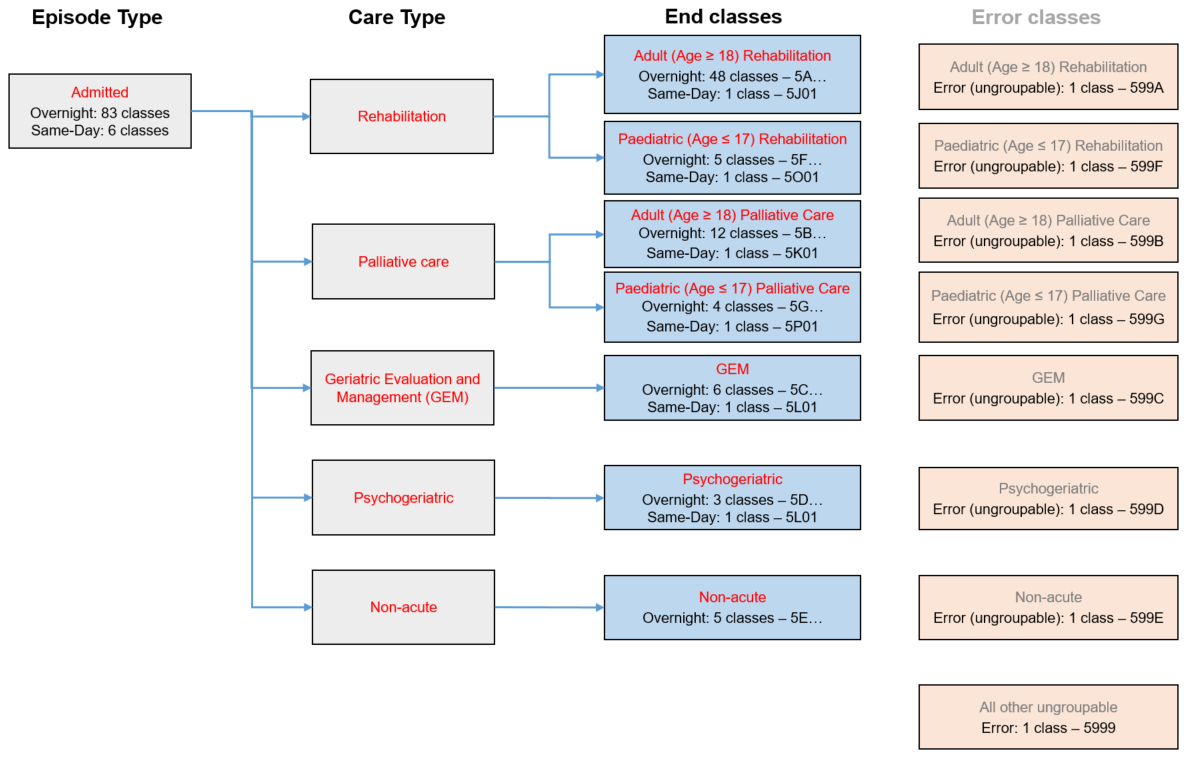
As was noted for AN-SNAP V4, clinicians will still collect and use FIMTM according to the established protocols. The weighted FIMTM Motor score is calculated automatically in the software that groups episodes to the respective classes, so the weightings have no impact on day-to-day clinical practice.

## 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

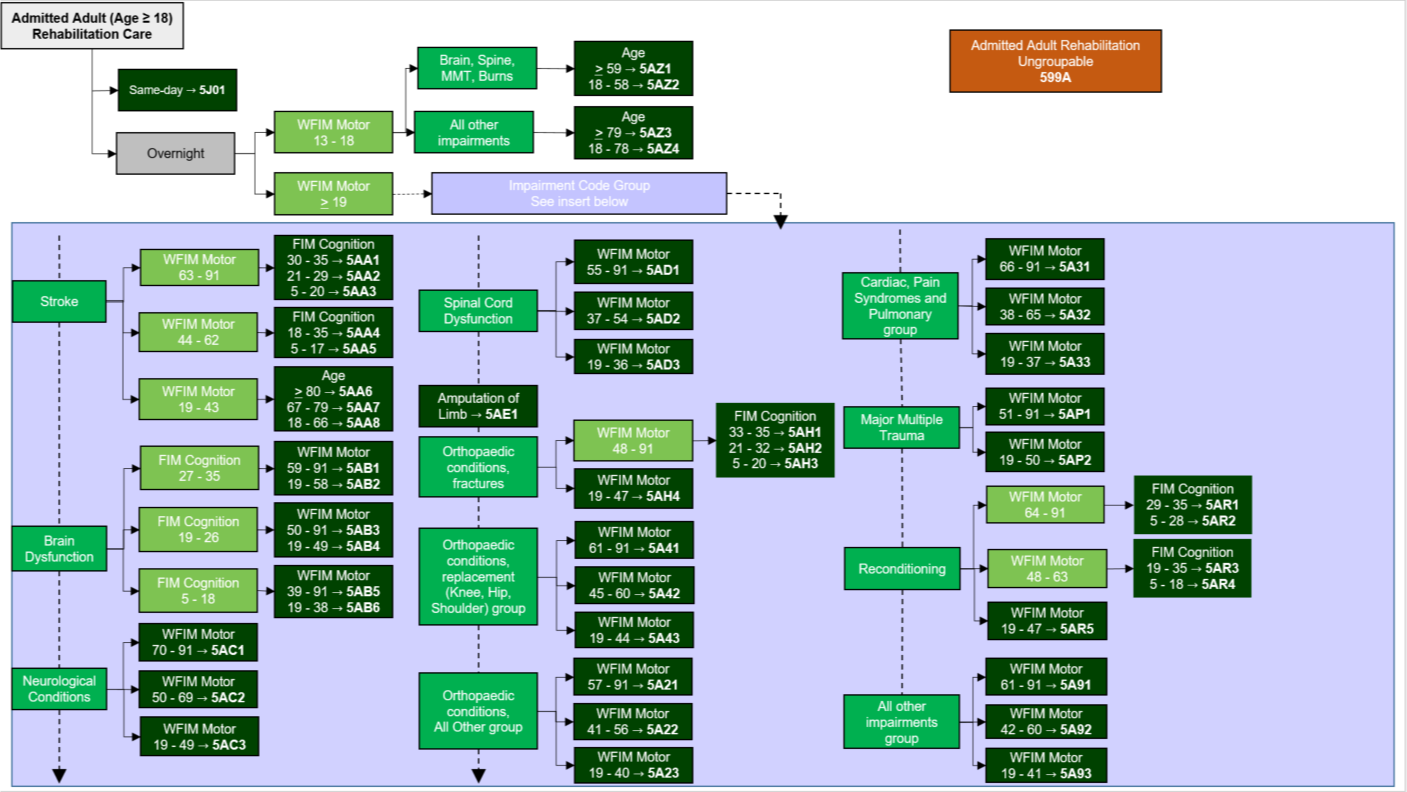


A complete table of the AN-SNAP V5 classification admitted end classes including variables, thresholds and key characteristics of the classes is at [Appendix G](#APPENDIX_G).

### 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



#### 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](#V4_Samedayrehabilitation).

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 FIMTM 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.

#### Overnight higher complexity (WFIMTM Motor score 13 - 18) classes

AN-SNAP V5 has four higher complexity (low WFIMTM Motor score 13 - 18) classes, as detailed in Table 11 (cf. four classes in [V4](#V4_LowWFIM_Allotherimpair)).

Table 11. Higher complexity classes (low WFIMTM Motor score 13 - 18)

| End class for V5 | Description and thresholds for V5 | | | Episodes | Average cost | Average length of stay | CoV |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Rehabilitation care | | | | | | | |
| Low WFIMTM – 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 WFIMTM – 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 WFIMTM Motor score

AN-SNAP V5, like V4, uses a WFIMTM Motor score as the first split in the Admitted Adult Rehabilitation Overnight branch. Two groups are created: a low functioning group (high complexity) with WFIMTM Motor scores of 13 to 18; and a higher functioning group (lower complexity) with WFIMTM 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 WFIMTM Motor score regardless of the impairment type. IHPA tested whether the FIMTM 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]](#footnote-15)

In AN-SNAP V4, the very low WFIMTM 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 WFIMTM Motor score) - Impairment type cost profile

| AN-SNAP V4 Grouping | Impairment type | Av. age | Episode volume | Average cost | Standard deviation |
| --- | --- | --- | --- | --- | --- |
| Low WFIMTM (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 WFIMTM (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 |

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 WFIMTM Motor Burns episodes to be moved from the lower average cost Group 2 to the high-cost Group 1.

#### Overnight lower complexity (WFIMTM Motor score ≥ 19) classes

The lower complexity admitted adult rehabilitation overnight episodes (with a WFIMTM 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](#Stroke)).

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](#V4_Braindysfunction)).

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 FIMTM sub-scores (WFIMTM Motor and FIMTM Cognition) are applied as splitting variables for the brain dysfunction impairment type. That is, in V5, brain dysfunction episodes are first grouped by FIMTM Cognition scores and then by WFIMTM Motor scores.

Changing the order that the FIMTM 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 FIMTM cognition as a better explanatory variable than FIMTM 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 FIMTM Cognition score 5 - 18 and then weighted FIMTM 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](#V4_Neurologicalconditions)).

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 FIMTM 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](#V4_Spinalcorddysfunction)).

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](#V4_AmputationofLimb)).

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 WFIMTM. 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](#V4_Orthopaedicconditions_fractures)).

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]](#footnote-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:

* 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 WFIMTM 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](#V4_Orthopaedicconditions_allother)).

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](#V4_Cardiac_Painsyndromes_Pulmonary)).

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](#V4_MajorMultipleTrauma)).

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 FIMTM 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](#V4_Reconditioning)).

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 WFIMTM Motor groups at the first split
* a second order FIMTM Cognition split is applied to all except the lowest WFIMTM Motor groups (as compared to AN-SNAP V4 where there was no FIMTM Cognition applied to the lowest and the highest FIMTM Motor groups)
* thresholds for the WFIMTM Motor and FIMTM 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 FIMTM Cognition before a weighted FIMTM 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 FIMTM Cognition split group was not as distinct compared to the WFIMTM Motor split groups.

Second, IHPA investigated using the ICD-10-AM diagnoses Delirium and/or Dementia as a variable applied after WFIMTM Motor. This approach did not perform as well statistically as the WFIMTM Motor followed by FIMTM 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](#V4_Allotherimpairmenttypes)).

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 FIMTM Motor weights and a statistically driven update of the threshold scores to improve the performance.

### Admitted paediatric rehabilitation classes

AN-SNAP V5 has the same admitted paediatric rehabilitation structure (Figure 4) and classes (Table 27) as AN-SNAP [V4](#V4_Paediatric_rehabilitation).[[17]](#footnote-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

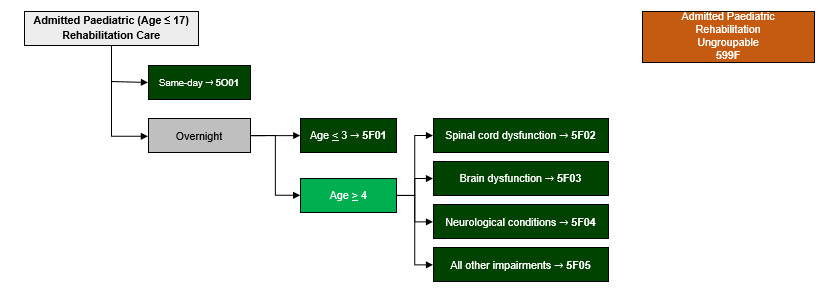


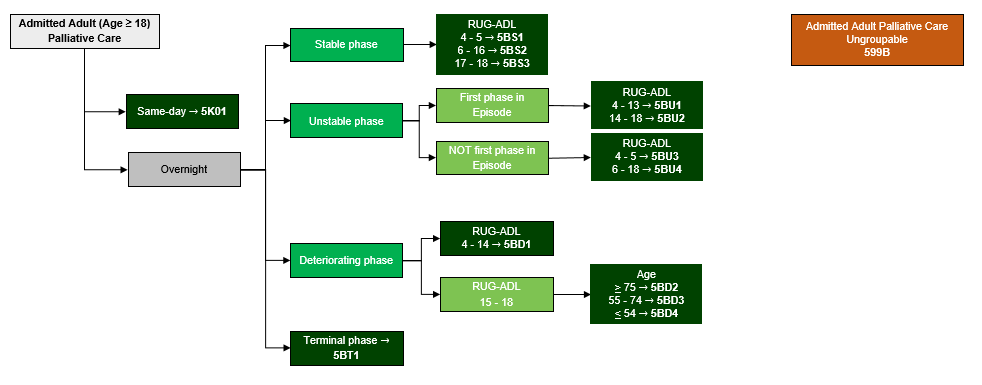
Table 27. Paediatric rehabilitation classes

| 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 |

### Admitted adult palliative care classes

The admitted adult palliative care branch of AN-SNAP V5 is the same as AN-SNAP [V4](#V4_Adult_Palliativecare): one same-day class and twelve overnight classes (Figure 5).

Figure 5. Adult Palliative care structure



#### 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.

#### 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](#V4_Adult_Palliativecare).

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 |

#### 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](#V4_Palliativecare_Adult).

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 |

### 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](#V4_paediatricpalliativecare).[[18]](#footnote-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

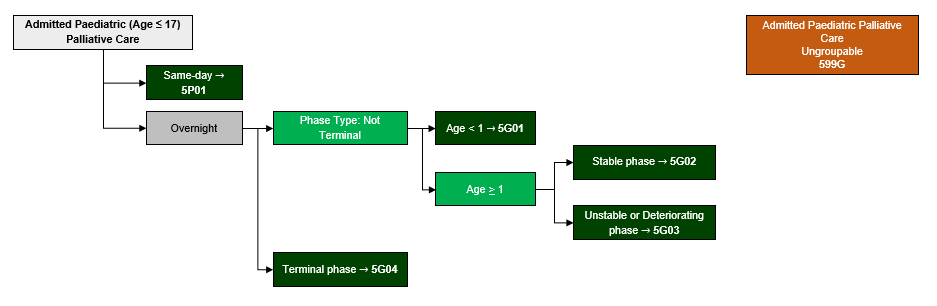


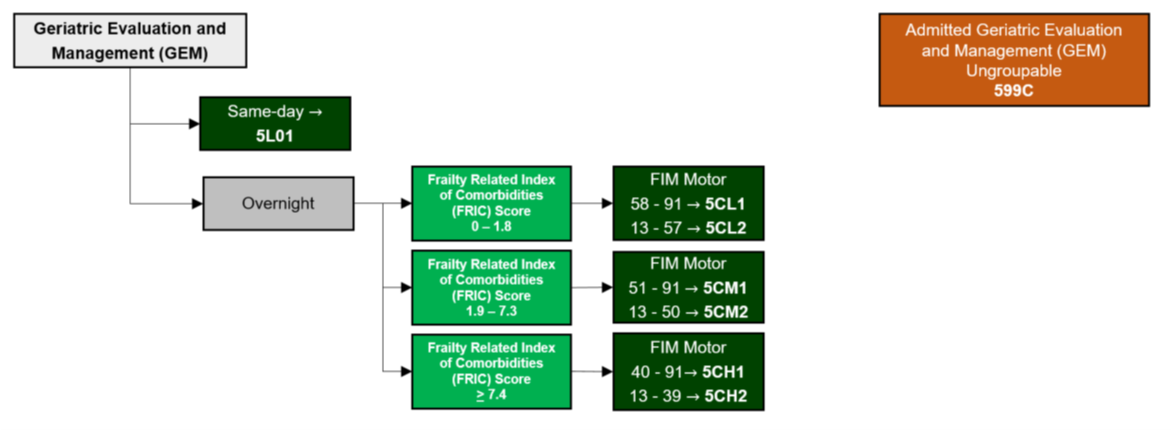
Table 30. Paediatric palliative care classes

| 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 |

### 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).

Figure 7. Geriatric evaluation and management structure



#### 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](#V4_Geriatricevaluationandmanagement).

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 |

#### 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 FIMTM 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](#V4_Geriatricevaluationandmanagement)).

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]](#footnote-19) The analysis showed that a first split of FRIC and a secondary split of FIMTM Motor outperformed using the SMMSE. The FRIC with FIMTM Motor also outperformed the AN-SNAP V4 structure splits of FIMTM 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](#Consultationspotlight_2) and [#3](#Consultationspotlight_3)). Nonetheless, IHPA’s view is that it is a suitably beneficial change given:

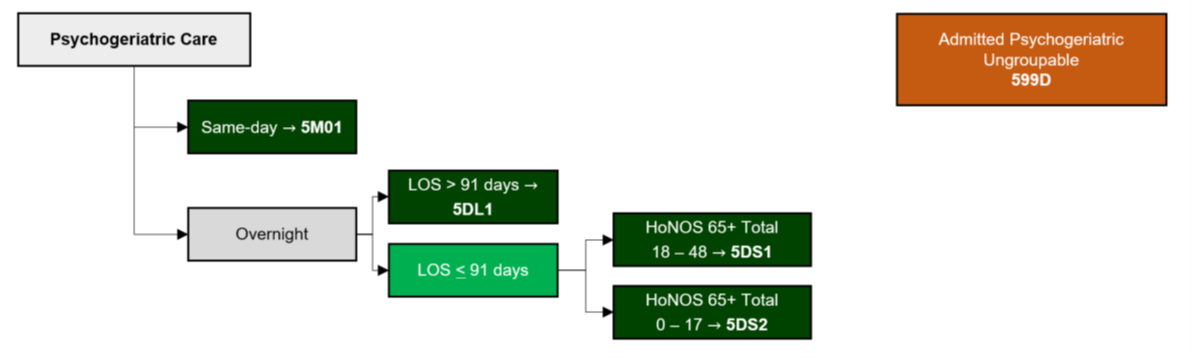
* There is broad agreement across a wide range of stakeholders that frailty is a cost-driver for subacute care and that it should be recognised in the subacute care classification; but there is no prospective clinical frailty measure immediately available (that is, currently collected as part of the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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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](#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. | |

### 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



#### 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](#V4_Psychogeriatric).

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 |

#### 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](#V4_Psychogeriatric)).

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).

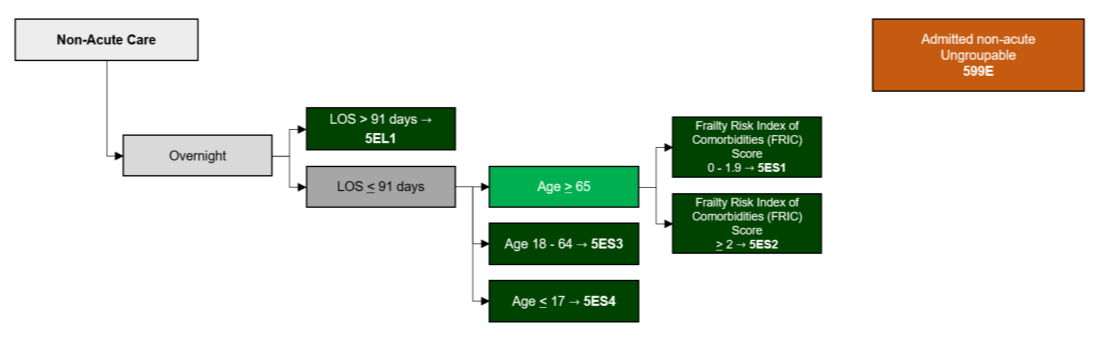
Further consultation on this issue with other stakeholders was inconclusive. One jurisdiction and a major health facility providing psychogeriatric care indicated support for using a HoNOS 65+ total score, and the other jurisdiction with a concentration of psychogeriatric care did not offer comment. 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.

### 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



#### 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](#V4_Nonacute)).

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.

# 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]](#footnote-20)

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

| Care type | Subgroup | Episodes1 | 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.

### 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.](#APPENDIX_H)

# 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.](#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 - FIMTM) * **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. |

# Future work

### 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.

### WeeFIMTM

The Functional Independence Measure (FIMTM) 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 FIMTM instrument.[[21]](#footnote-21)

The Functional Independence Measure for children (WeeFIMTM) 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, WeeFIMTM was considered as a potential variable for the classification. However, with WeeFIMTM 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 WeeFIMTM 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 WeeFIMTM collection with the Australian Paediatric Rehabilitation Outcomes Collection requirements.

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](https://www.ihpa.gov.au/past-consultations/draft-australian-national-subacute-and-non-acute-patient-classification-version).

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**

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.

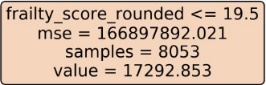
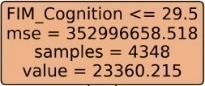
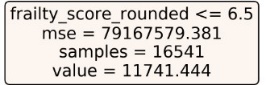
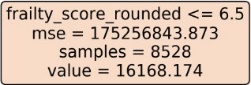
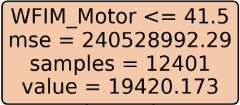
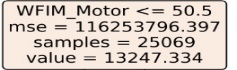
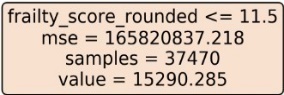
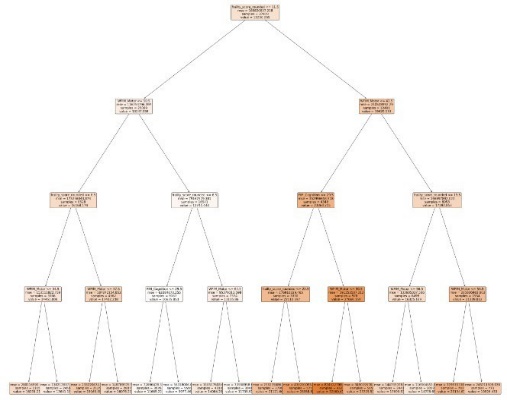
**Step 2 – Short list potential variables**

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 MeasureTM (FIMTM) Motor score – WFIMTM. After the first FRIC split, the second level splits both adopted WFIMTM Motor. Therefore, the CART algorithm helps determine the order and interaction of the best performing variables (that is,FRIC and WFIMTM 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 WFIMTM 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]](#footnote-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]](#footnote-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).

**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]](#footnote-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
* 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 represented by other more specific codes within ICD-10-AM. | N/A |
| 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 |
| 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 |
| 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. All other codes not excluded. | Clinical advice stated these stages are mild and mostly asymptomatic. | 1.4 |
| 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 |
| 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. All other codes not excluded. | These codes capture injuries that are likely to be insignificant. | 2.4 |
| 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 addition to the complication or condition. | N/A |
| 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]](#footnote-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. |
| 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 FIMTM item weights

Table 44. Impairment group-specific FIMTM 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 FIMTM Motor Groups**

AN-SNAP V5 retains the same groups established in AN-SNAP V4 to ensure adequate episodes for the FIMTM Motor weight calculation. Impairments that are grouped together in the classification adopted the same FIMTM 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
| 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 |
|  | | | | | | |
| **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 FIMTM 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 (Mid 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 |



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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](https://www.aihw.gov.au/getmedia/01d815ba-3d66-48c9-a9ec-aaa5825c19f2/15425.pdf.aspx?inline=true). Cat no HSE 135. Canberra, AIHW. [↑](#footnote-ref-1)
2. Green J, Gordon R, Blanchard M, Kobel C and Eager K. (2015), [*Development of AN-SNAP Version 4: Final Report*](https://www.ihpa.gov.au/sites/default/files/Documents/an-snap_classification_version_4_final_report.pdf), Centre for Health Service Development, University of Wollongong. [↑](#footnote-ref-2)
3. See, for example, Independent Hospital Pricing Authority, [National Pricing Model 2021-22 – Technical Specifications – March 2021](https://www.ihpa.gov.au/sites/default/files/publications/national_pricing_model_technical_specification_2021-22_0.docx) [↑](#footnote-ref-3)
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. [↑](#footnote-ref-4)
5. Adapted from Clegg A, Young J, Iliffe S, Rikkert M, Rockwood, K. (2013) *Frailty in elderly people*, Lancet; 381: 752-62. [↑](#footnote-ref-5)
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 [↑](#footnote-ref-6)
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. [↑](#footnote-ref-7)
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 [↑](#footnote-ref-8)
9. Independent Hospital Pricing Authority (2019) [*Australian Refined Diagnosis Related Groups Version 10.0 Final Report*](https://www.ihpa.gov.au/sites/default/files/consultation_paper_on_australian_refined_diagnosis_related_groups_version_10.0.pdf?acsf_files_redirect)*.* [↑](#footnote-ref-9)
10. See for example, Green J, Gordon R, Blanchard M, Kobel C and Eager K. (2015), [*Development of AN-SNAP Version 4: Final Report*](https://www.ihpa.gov.au/sites/default/files/Documents/an-snap_classification_version_4_final_report.pdf), Centre for Health Service Development, University of Wollongong. [↑](#footnote-ref-10)
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. [↑](#footnote-ref-11)
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. [↑](#footnote-ref-12)
13. See Australian Institute of Health and Welfare, [Metadata Online Data Registry (MeTeOR) identifier 711010](https://meteor.aihw.gov.au/content/index.phtml/itemId/711010) [↑](#footnote-ref-13)
14. See Green J, Gordon R, Blanchard M, Kobel C and Eager K. (2015),[*Development of AN-SNAP Version 4: Final Report*](https://www.ihpa.gov.au/sites/default/files/Documents/an-snap_classification_version_4_final_report.pdf), Centre for Health Service Development, University of Wollongong. [↑](#footnote-ref-14)
15. Australian Institute of Health and Welfare, [Metadata Online Data Registry (MeTeOR) identifier 498498](https://meteor.aihw.gov.au/content/index.phtml/itemId/498498); see also Australasian Rehabilitation Outcomes Centre (2013) [AROC Impairment Coding Guidelines](https://documents.uow.edu.au/content/groups/public/@web/@chsd/@aroc/documents/doc/uow125260.pdf) [↑](#footnote-ref-15)
16. Australasian Rehabilitation Outcomes Centre (2013) [AROC Impairment Coding Guidelines](https://documents.uow.edu.au/content/groups/public/@web/@chsd/@aroc/documents/doc/uow125260.pdf) [↑](#footnote-ref-16)
17. 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. [↑](#footnote-ref-17)
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. [↑](#footnote-ref-18)
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. [↑](#footnote-ref-19)
20. See, for example, Independent Hospital Pricing Authority, [National Pricing Model 2021-22 – Technical Specifications – March 2021](https://www.ihpa.gov.au/sites/default/files/publications/national_pricing_model_technical_specification_2021-22_0.docx) [↑](#footnote-ref-20)
21. See Australian Institute of Health and Welfare, [Metadata Online Data Registry (MeTeOR) identifier 717982](https://meteor.aihw.gov.au/content/index.phtml/itemId/717982) [↑](#footnote-ref-21)
22. Adapted from Clegg A, Young J, Iliffe S, Rikkert M, Rockwood, K. (2013) *Frailty in elderly people*, Lancet; 381: 752-62. [↑](#footnote-ref-22)
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 [↑](#footnote-ref-23)
24. Independent Hospital Pricing Authority (2019) [*Australian Refined Diagnosis Related Groups Version 10.0 Final Report*](https://www.ihpa.gov.au/sites/default/files/consultation_paper_on_australian_refined_diagnosis_related_groups_version_10.0.pdf?acsf_files_redirect)*.* [↑](#footnote-ref-24)
25. See Australian Institute of Health and Welfare, [Metadata Online Data Registry (MeTeOR) identifier 711010](https://meteor.aihw.gov.au/content/index.phtml/itemId/711010) [↑](#footnote-ref-25)