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The Australian National Sub-Acute and Non-Acute Patient Classification (AN-SNAP): Report of the National Sub-Acute and Non-Acute Casemix Classification Study

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Centre for Health Service Development
University of Wollongong
August 1997

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August 1997

Report of a study funded jointly by the Commonwealth Department of Health and Family Services and the NSW Health Department and undertaken by the National SNAP Study Team of the Centre for Health Service Development, University of Wollongong.

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Executive Summary

The purpose of the National SNAP study was to develop a casemix classification for sub-acute and non-acute care provided in a variety of treatment settings. The study was established so that the resultant classification could be used for both funding and clinical management purposes.

This report outlines the goals, methodology and results of the study. A casemix classification for both overnight and ambulatory care has been developed. It has 134 classes and explains 57.99% of the variance in all episode costs. Of this 58%, 21% was contributed by Episode Type and 37% by the classes. The overnight branch has 66 classes and explains 47.29% of the variance in the cost of overnight care. The ambulatory branch has 68 classes and explains 28.11% of variance in the cost of ambulatory care.

The classification is designed to allow it to be used in several different ways:

- Each of the two major branches (overnight and ambulatory) can be employed on their own or in combination with another classification (such as DRGs) AND/OR

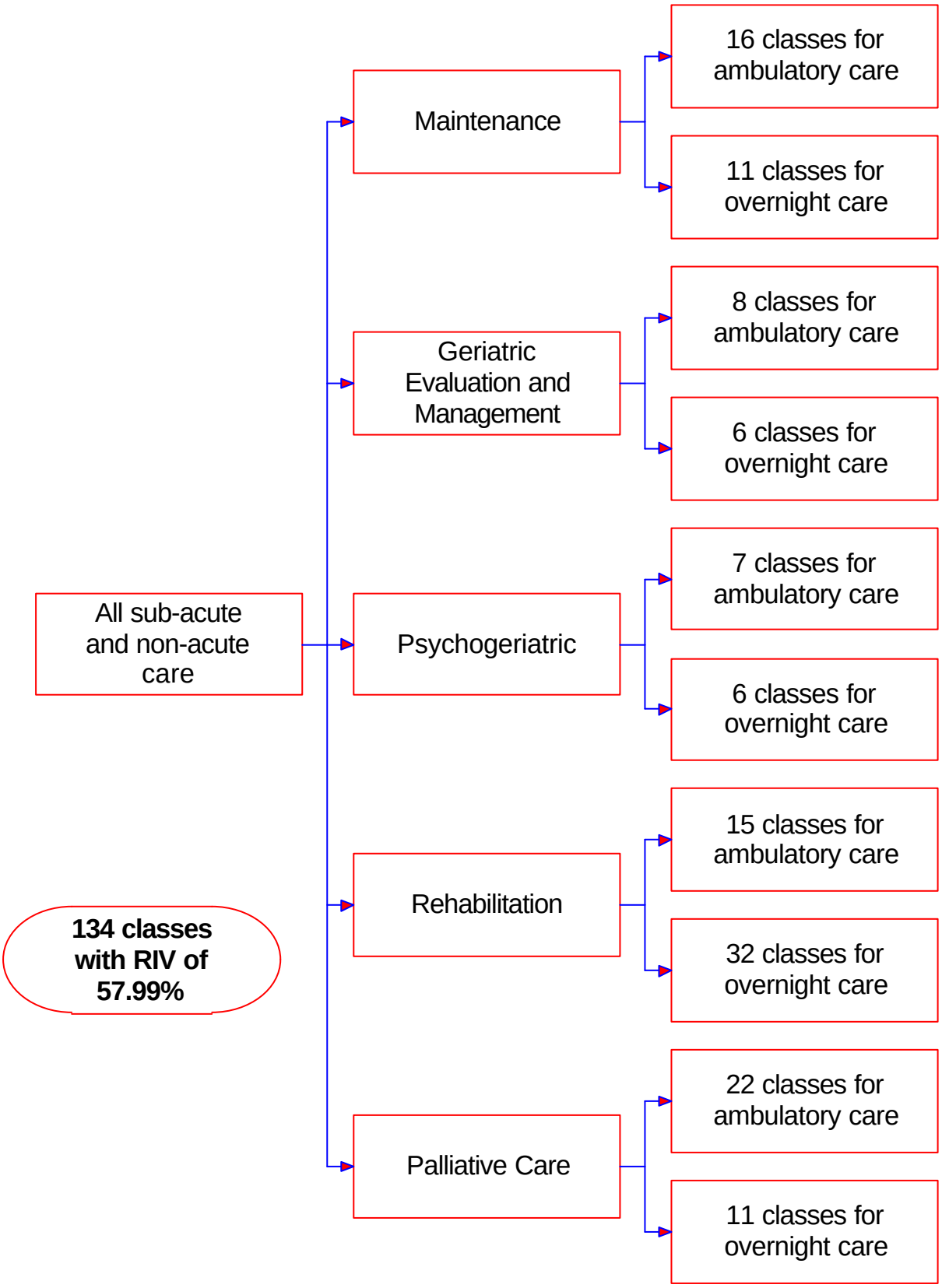
- The classes can be used on a 'mix and match' basis. For example, an overnight class can be combined with an ambulatory class to form a total payment for care that crosses treatment settings OR

- It may be possible that, with experience, each of the classes could be employed as a building block in the development of standard packages of care that encompass different treatment settings. The existing SNAP data set could be further analysed to assess the feasibility of moving from a classification of 'episodes of care' to a classification of 'episodes of illness'.

The overall structure of the classification is shown in Figure i. The statistical and clinical performance is considered to be satisfactory and is sufficiently good to allow the classification to be used for both management and funding purposes.

The classification has been termed the ***Australian National Sub-Acute and Non-Acute Patient (AN-SNAP)*** Version 1 classification.

Figure i The All Episode AN-SNAP Version 1 Classification



Scope

This is a study of patient care episodes. Five different **Case Types** are included. They are:

1 Palliative Care
2 Rehabilitation
3 Psychogeriatric
4 Geriatric Evaluation and Management
5 Maintenance

Each Case Type is defined based on both the characteristics of the person and on the goal of intervention. The purpose is to classify the patient and not the service / stream of care / ward in which they are treated.

Four different **Episode Types** are included:

1 Overnight episodes
2 Same day episodes
3 Outpatient episodes
4 Community episodes

The unit of counting is an episode of care. For Palliative Care, the unit of counting is a Phase of Care. For the three ambulatory Episode Types - same day, outpatient and community - an episode of care is a sequence of care, not each individual day.

Definitions of an episode of care, a phase of palliative care, the five Case Types and the four Episode Types are included in Appendix 4.

Method

A total of 99 sites in all Australian States and Territories and 5 sites in New Zealand were selected for participation in the study. They are listed in Appendix 6 and represent:

- Public hospitals, including principal referral hospitals, major referral hospitals, major rural base hospitals, district hospitals, small community hospitals and designated hospices, rehabilitation centres and other sub-acute and non-acute hospitals

- Private hospitals, including designated hospices, rehabilitation centres and general hospitals

- Community health centres, domiciliary nursing services and other community care agencies

Between them, these 104 sites collected a detailed clinical and service utilisation profile of 30,604 sub-acute and non-acute episodes over the data collection period. The data collection began at most sites on 1 July 1996 and continued for 3 months. Some sites began the collection in August or September. Certain specialist spinal injury and brain injury units continued the data collection up until Christmas 1996, making the maximum collection a period of 26 weeks.

The sample of episodes collected by the 104 sites is shown in Figure ii.

Figure ii The Edited SNAP Episode Data Set

		EPISODE TYPE				
		Overnight patient	Same day patient	Outpatient	Community client	**TOTAL**
CASE TYPE	Palliative care	1,868	54	148	2,526	**4,596**
	Rehabilitation	7,397	603	1,704	741	**10,445**
	Psychogeriatric	479	13	102	363	**957**
	Geriatric evaluation and management	1,882	262	655	2,437	**5,236**
	Maintenance care	1,565	58	851	6,896	**9,370**
	TOTAL	**13,191**	**990**	**3,460**	**12,963**	**30,604**

A common set of data items were collected for all five Case Types. This data set is shown in Figure iii below.

Figure iii Common Data Items for the five Case Types

IDENTIFIERS	**SOCIO-DEMOGRAPHIC**	**EPISODE DETAILS**
Patient/client number	Date of birth	Episode type
		Episode start date
		Assessment only
Patient/client name (for site use only - deleted before data was sent to the study team)	Need for Interpreter service	Reason for episode start
		Leave days (admitted patients only).
Medicare number (for use as an identifier by study team only - deleted before de-identified data provided to health authorities)	Aboriginality	Sole Practitioner Intervention
		Episode end date
		Reason for episode end

Data items were also collected that were specific to one or more Case Types. These items are shown in Figure iv.

Figure iv Specific Data Items for each of the Five Case Types

Palliative Care	Rehabilitation	Psychogeriatric	Geriatric Evaluation and Management	Maintenance
Episode start RUG-ADL score	Episode start FIM score **or** Barthel score **with** RUG-ADL score	Episode start RUG-ADL score	Episode start FIM score **or** Barthel score **with** RUG-ADL score	Episode start RUG-ADL score
Palliative Care Phase (Stable, Unstable, Deteriorating, Terminal and Bereaved)	Impairment code	Psychogeriatric phase (Acute, Rehabilitation, Consolidation, Monitoring and follow-up)	Impairment code	Type of maintenance care (Convalescent, Respite, Nursing Home Type, Community maintenance care, Other)
Problem Severity Score (Pain, Other Symptom, Psychological/ spiritual, Family/ Carer)	Compensable status	Diagnosis, pick list of 9		Diagnosis, pick list of 10 (Victorian ACAT list)
	First episode for this impairment.	First episode for this impairment		
Phase Change	Behaviour Scale	Behaviour Scale	Behaviour Scale	Behaviour Scale
Episode end RUG-ADL Score	Mini Mental State Examination (MMSE)	Mini Mental State Examination (MMSE)	Mini Mental State Examination (MMSE)	Mini Mental State Examination (MMSE)
	Episode end FIM score **or** Barthel score **with** RUG-ADL score	Health of the Nation Outcome Scale (HoNOS)	Episode end FIM score **or** Barthel score **with** RUG-ADL score	Episode end RUG-ADL score
		Episode end RUG-ADL score		

Participating sites collected a comprehensive service utilisation profile of each episode. The most intensive component of the collection was the capture of a daily log of time by 14,742 staff at participating sites.

Each episode was costed on a daily basis. The costing was comprehensive and all costs were categorised into one of twelve cost groups. These twelve cost groups were then split into Core Costs and Other Costs. Core Costs only were used to develop the overnight casemix classes. These 'Core Costs' comprised over 90% of the full episode cost. The ambulatory classes were created using the sum of core cost and medical cost. These costs comprised over 95% of the full episode cost. All other costs were then added back in to derive a final cost for each class. The rationale for this approach is discussed in Section 4.3.3 of the report.

The service components costed in the study are shown in Figure v. Each cost group contained a share of overhead costs.

Figure v Services Costed in the Study

'Core Cost' Services	'Other Cost' Services
Nursing	Medical
Physical therapies	Imaging
Psychosocial services	Pathology
Other allied health	Pharmacy
Medical & surgical supplies	Capital
Goods and services	Volunteer time

After the casemix classes were developed using the classification costs only, the average cost per class was calculated for each "Other Cost" and these were then added back into each class.

In total, 2.156 million hours of staff time were recorded into the SNAP data base. Across all sites and all disciplines, this staff time had an average cost of 47 cents a minute ($28.20 per hour). After the allocation of salary related overhead costs, the average final cost was 62 cents per minute ($37.20 per hour). As already noted, the SNAP study also captured the cost of goods and services, imaging, pathology and non-staff related overhead costs.

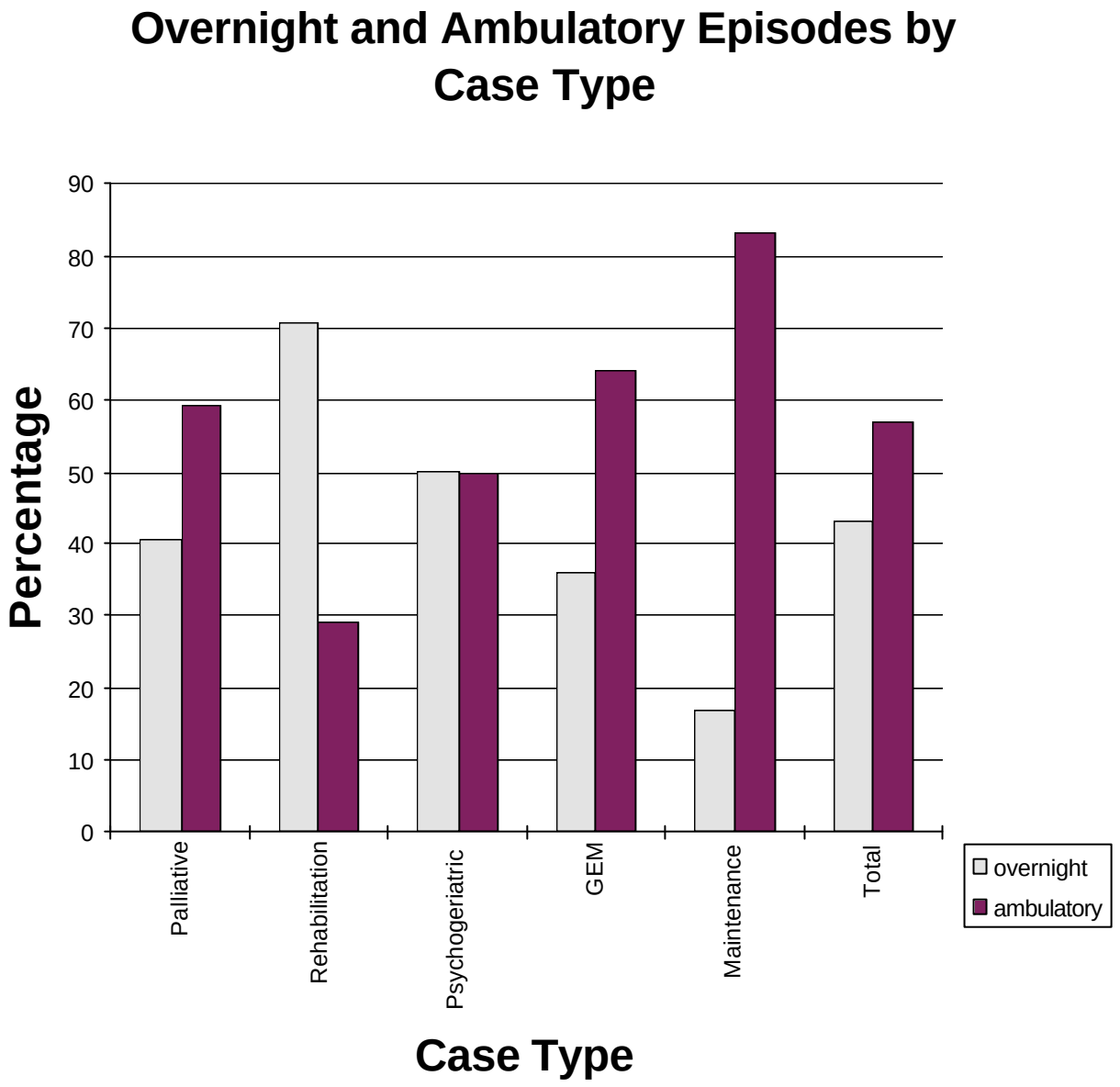
In addition to collecting patient-related staff time for both overnight and ambulatory episodes, the study also captured time spent on teaching and learning, research and health promotion. The allocation of staff time between these 5 final products is shown in Figure vi. The allocation of time for out of scope patients (both primary care and acute) is included in the figures for both overnight and ambulatory patients. Each of the 5 final products has been allocated its share of general clinical and other overhead time using the algorithm shown in Figure 31 in the full report. The costs and the time of designated teaching, research and health promotion staff were excluded from the data collection at most sites.

Figure vi Allocation of staff time between the five final products

Product Type	Hours of Staff Time Reported	Percentage of Staff Time
Overnight patients	1,645,332	76.30%
Ambulatory clients	450,030	20.96%
Teaching and Learning	40,054	1.86%
Research	13,304	0.62%
Health Promotion	5,531	0.26%
TOTAL	**2,156,251**	**100.00%**

Figure vii shows the mix of overnight and ambulatory episodes for each Case Type. Ambulatory episodes include same day, outpatient and community episodes.

Figure vii



There were significant differences between the Case Types. The majority of Rehabilitation episodes were overnight episodes. Psychogeriatric episodes occurred equally in overnight and ambulatory care. The majority of Palliative Care, GEM and Maintenance episodes were ambulatory.

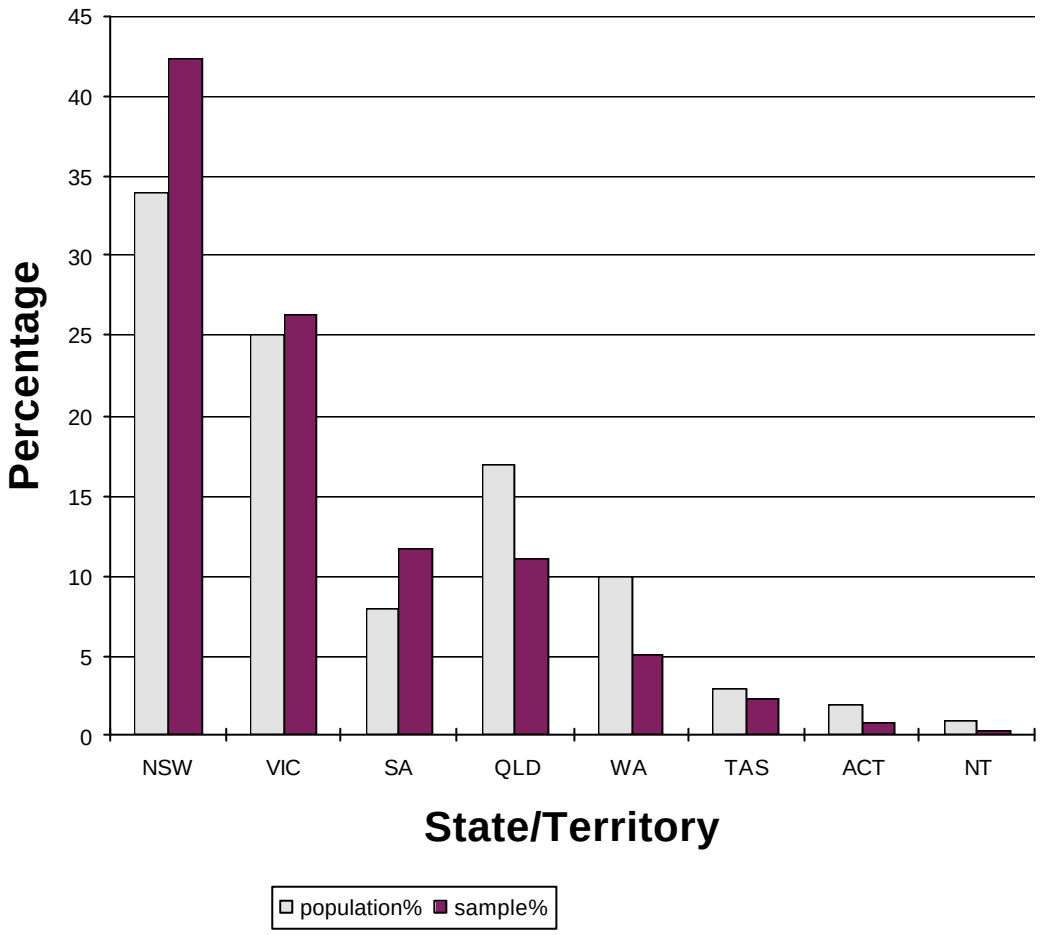
Figure viii shows the Australian overnight sample by State/Territory. The sampling framework for the study specified that States and Territories were to be included in the sample in proportion to total population in each State/Territory. No such criterion was applied to ambulatory episodes.

Relative to population, three States were over-represented in the sample - NSW, Victoria and South Australia. South Australia was proportionally the most over-represented. The other States and Territories were all proportionally under-represented. Western Australia was proportionally the most under-represented, followed by the Australian Capital Territory and Queensland. Tasmania and the Northern Territory were both a little below initial estimates.

One reason is that the sampling framework included the over-sampling of low volume, high cost

cases. These cases are more likely to be treated in specialised units and it appears that the States of NSW, Victoria and South Australia have proportionally more specialised units (such as brain injury and spinal injury units) than the other States. A further reason is that the great majority of private sector services are provided in NSW, Victoria and South Australia.

Figure viii Overnight Sample by State/Territory



The AN-SNAP Version 1 Classification

The AN-SNAP all episode classification for both overnight and ambulatory care has 134 classes and explains 57.99% of the variance in all episode costs.

The overnight section has 66 classes and five branches, one for each of the five Case Types. The number of classes by Case Type are:

Palliative Care	11
Rehabilitation	32
Psychogeriatric Care	6
Geriatric Evaluation and Management	6
Maintenance Care	11

AN-SNAP Version 1 explains 47.29% of the variance in overnight episode costs. The classification design for each Case Type is discussed in Section 5.6 and the final classes within each branch are shown in Figures 168, 171, 172, 173 and 174 in the full report. The reduction in variance by Case Type is:

Palliative Care	20.98%
Rehabilitation	38.21%
Psychogeriatric Care	36.40%
Geriatric Evaluation and Management	9.97%
Maintenance Care	52.95%

The ambulatory section has 68 classes and five branches, one for each of the five Case Types. The number of classes by Case Type are:

Palliative Care	22
Rehabilitation	15
Psychogeriatric Care	7
Geriatric Evaluation and Management	8
Maintenance Care	16

AN-SNAP Version 1 explains 28.11% of the variance in ambulatory episode costs.

The classification design for each Case Type is discussed in Section 5.7 and the final classes within each branch are shown in Figures 175, 176, 177, 178 and 179. The reduction in variance within each Case Type is:

Palliative Care	17.14%
Rehabilitation	28.58%
Psychogeriatric Care	20.06%
Geriatric Evaluation and Management	37.75%
Maintenance Care	22.49%

Each class has been assigned a 3 digit class number. The first digit indicates the Case Type (1 for Palliative Care, 2 for Rehabilitation, 3 for Psychogeriatric, 4 for GEM and 5 for Maintenance). The second and third digits indicate the class number within each branch. Class numbers between 01 and 50 indicate classes for overnight episodes. Class numbers between 51 and 99 indicate classes for ambulatory care.

Several classes contain long-term care episodes. In these cases, the costs and the cost weights have been scaled to provide a standard 3 month episode cost. The funding implications of this approach are discussed in Sections 7.4 and 7.5.

A small number of the classes had low volumes of observations in this study. This was inevitable in a study that was a three month snapshot of only a proportion of sub-acute and non-acute care in Australia. Small volume classes were established in this first version of the classification only where the data demonstrated that the episodes were sufficiently different from other episodes (based on both statistical and clinical criteria) and sufficiently similar to each other to justify the creation of a separate class. Each of these classes should have well in excess of 200 cases per year if the classification is applied on a national basis.

The costs and cost weights for each of the classes are shown in Figures 185, 189 and 191 in the full report. These results are based on Core Costs only. Final cost weights, per diem costs, per diem cost weights, average lengths of stay, standard deviations and coefficients of variance are included in the Appendices.

Major findings and implications

Diversity

A critical finding of this study is that there is significant diversity in the cost of sub-acute and non-acute care. There is a 30 fold variation in episode cost between the most expensive and the least expensive class in the AN-SNAP overnight classification and a 5 fold variation in per diem cost.

Likewise, there is significant diversity in the cost of ambulatory sub-acute and non-acute care. There is a 48 fold variation in episode cost and a 5 fold variation in per diem cost between the most expensive and the least expensive class in the ambulatory classification.

Episode Classification

The findings confirm that there is an underlying episode classification, not just in overnight care, but also in ambulatory care. It is possible to classify ambulatory episodes (outpatients and community health) on an episode basis and not just a per diem basis.

Cost Drivers

The variables driving costs in the inpatient setting are also important cost drivers in the ambulatory setting. However, there are other factors at play in the ambulatory setting. Community care is inherently more complex than institutional care. Common patient variables across institutional and community care are necessary but they are insufficient to adequately explain cost variation in ambulatory care.

The key cost drivers identified by the study have been used to create the classification. They are:

- **U** ***Case Type*** - characteristics of the person and the goal of treatment
- **U** ***function*** (motor and cognition) - all Case Types
- **U** ***phase*** (stage of illness) - palliative care
- **U** ***impairment*** - rehabilitation
- **U** ***behaviour*** - psychogeriatric
- **U** ***age*** - palliative care, rehabilitation, GEM and maintenance

There are additional cost drivers in ambulatory care which have been incorporated in the ambulatory branches:

- **U** ***problem severity*** - palliative care
- **U** ***phase*** - psychogeriatric
- **U** ***usage of other health and community services***

In addition, it is likely that carer availability and functional ability in instrumental ADLs (eg. medication management; food preparation) are also important cost drivers in sub-acute and non-acute care. The report recommends that these variables be tested for incorporation in future versions.

Opportunities for Service Substitution

The majority of patients being treated in the overnight setting were clinically different to those treated in the ambulatory setting. However, there was also a significant group of episodes that had a similar profile across both overnight and ambulatory care. The results suggest that there are opportunities, at least in some cases, to use the classification to promote service substitution between overnight care, institutional ambulatory care and community-based ambulatory care.

Information Collection

Many of the data items used in AN-SNAP are currently collected by individual service providers. But few are included in National and State data collections. This had been anticipated because it had already been demonstrated that a viable classification could not be found simply by employing those data items already captured on a routine basis. Any new classification would require the use of new variables.

There are obvious implications for service providers. For those already using the particular measurement instruments and collecting the required items on a routine basis, AN-SNAP poses no additional burden. For those already assessing the underlying attributes but by the use of different measurement instruments, implementation of AN-SNAP would require either a change in the instruments used or a successful mapping from one instrument to another. For those not assessing their patients with respect to attributes such as motor function, cognition and stage of illness, implementation of AN-SNAP would require additional work.

Irrespective of the current practices of local providers, implementation of AN-SNAP has important implications for information systems, coding and data entry. If for no other reason, this implies the need for a gradual, planned approach to implementation. However, one important feature of the variables used in AN-SNAP is that many of them are not only driving costs, they are also key measures of health outcomes. The collection of the one source data set (that is designed specifically for this care) can be an efficient investment of resources that can produce information which is useful:

- for funding,
- for clinical management and
- for measuring health outcomes

The Future

The National Sub-Acute and Non-Acute Casemix Classification Committee has recommended that AN-SNAP be adopted as the first version of the national classification, noting that implementation is a matter for each jurisdiction and that the classification will require ongoing development over time. There are three issues that now need to be addressed. The first is the interface between the various casemix classification systems that are now available or are developing. The second is the planning for the phased implementation of the classification in a way that takes account of the implications for training and information systems and the need to model the impact on providers. Implementation issues, including timing, policy, method and scope, are matters for each jurisdiction. The third is the ongoing improvement of the classification itself. The SNAP study has produced the first version of the classification. Ongoing refinement (leading to Version 2) will be possible through further analysis of the existing data set in combination with analysis of the results of a carefully planned and phased implementation.

1 Introduction

Health care is inherently complicated. Each year the health system treats literally millions of people, undertakes millions of processes and produces a complex array of outcomes. Measurement tools are required to aid understanding of this inherent diversity and to assist the health system towards systematic improvement.

Each patient is unique and it is fundamental to high quality health care that this uniqueness be recognised. But it is also useful to classify patients into groups based on resource consumption, patient conditions and health care interventions. Such classification is required because it helps to understand variations between patients. By controlling for variations between patients, we start to produce information which helps in understanding the differences between providers.

The purpose of the National SNAP study reported here is to develop a casemix classification for sub-acute and non-acute care provided in a variety of treatment settings. This classification is to be able to be used for both funding and clinical management purposes and is designed to assist understanding of the inherent diversity that exists in this growing component of the health care system.

For the purposes of this study, sub-acute care is care provided to a person who requires health services but whose principal medical diagnosis (modified for factors such as age and procedures) is not adequate in explaining the need for, or the cost of, the services that they receive. In sub-acute care, the predominant treatment goal is enhancement in quality of life and/or functional status. In non-acute care, the predominant goal is maintenance of current health and functional status if possible.

1.1 Aim and objectives of the study

Aim

To build on previous studies in Sub-Acute and Non-Acute Casemix Classification by undertaking a nationally coordinated research study which will test and build on casemix classification variables and systems identified in earlier Australian studies.

Objectives

1. Develop a national casemix classification for sub-acute and non-acute care that includes an appropriate number of casemix classes, each of which is iso-resource and clinically sensible.
2. Develop a set of national cost weights for admitted patients for the recommended classification.
3. Develop preliminary cost weights for any other groups of patients where a more definitive result cannot be justified by the data collected in this study.

The research hypotheses to be tested

1 That, within sub-acute and non-acute care, there are five Case Types, each of which is clinically distinct as measured by the patient attributes to be captured in the study:

- Palliative care
- Rehabilitation
- Psychogeriatric
- Geriatric evaluation and management and
- Maintenance care.

2 That, for all Case Types, the patient attributes which best predict resource consumption in the inpatient setting will also predict resource consumption in the non-inpatient setting.

3 That, for palliative care, casemix classes can be developed based on palliative care phase, function and problem severity.

4 That, for rehabilitation, casemix classes can be developed based on impairment, function and age.

5 That, for psychogeriatrics, casemix classes can be developed based on diagnosis, function, cognition and behaviour.

6 That, for geriatric evaluation and management, casemix classes can be developed based on function, cognition and behaviour.

7 That, for maintenance care, casemix classes can be developed based on type of maintenance care, function, cognition and behaviour.

1.2 Background

In November 1993 the Australian Health Ministers Advisory Council endorsed a five year strategic plan for the National Casemix Development Program[1]. This plan established three priority areas - classification, costing and payments - and identified a series of required strategies including:

- determination of classification systems for rehabilitation, geriatric medicine, palliative care and psychiatric episodes;
- the development of associated cost weights; and
- the encouragement of clinicians, managers and industrial groups to link casemix accounting, information collection and budgeting to clinical management practices.

In 1995, the Commonwealth convened the first meeting of the National Sub-Acute and Non-Acute Casemix Committee whose role was to achieve national agreement on the development of a classification for sub-acute and non-acute care. The National Steering Committee resolved that a study should proceed (the National Sub-Acute and Non-Acute Casemix Classification Study) with the goal of establishing an agreed national classification (Version 1) for use by 1997-1998. Its scope was to include rehabilitation, geriatric medicine, palliative care and geriatric psychiatry episodes.

The NSW Health Department agreed to act as the lead agency and the project was commissioned

through the Casemix Area Network (CAN) and the Centre for Health Service Development, University of Wollongong. A National Steering Committee was formed to oversee the project. A National Clinical Project Team and a parallel Costing Project Team were also established to assist the research team develop the detailed study methodology. The composition of the National Steering Committee and the project teams is included in the Appendices.

Several Australian studies had already been undertaken before the National Sub-Acute and Non-Acute Casemix Classification Study was established. The purpose of these previous studies was to begin the process of developing a classification system suitable for sub-acute and non-acute care. However, the identification and classification of sub-acute and non-acute episodes in Australia has proved to be a difficult task. One important reason has been the limited availability of source data for classification development. The DRG classification uses variables which are routinely collected about each patient care episode. They include diagnoses, procedures, age and disposition. Only one new variable (admission weight for neonates) has been added to the Australian discharge data set in order to allow for DRG assignment.

In contrast, the variables currently collected in the routine discharge data set have been demonstrated to be ineffective in the classification of sub-acute and non-acute episodes[2]. Thus, work to develop a casemix classification for sub-acute and non-acute care has needed to commence from first principles. This has important implications. Most importantly, the introduction of a sub-acute and non-acute casemix classification system requires that new data be routinely collected. The introduction of new data items raises questions such as the data items to be collected, the process for data collection and the need for national standard definitions.

In the absence of standard funding program structures and definitions of sub-acute and non-acute episode types, it is difficult to estimate current national expenditure on sub-acute and non-acute care. However, information is available on South Australian expenditure for admitted patients and on NSW expenditure by program type. Funding for sub-acute and non-acute inpatient care in South Australia represents 10.8% of all inpatient funding or 6.9% of all hospital funding. Data are not available on SA expenditure on non-admitted patients. The majority of sub-acute and non-acute care in NSW is funded through a Program known as Rehabilitation and Extended Care. It comprises 10.8% of the State health budget. In addition, some psychogeriatric care is funded through the Mental Health program and some community based sub-acute and non-acute care through the Primary and Community based Services Program. By way of comparison, funding on overnight acute patients comprises 51.9% of the State health budget and funding on outpatients is 6.6%. There is no reason to believe that the investment pattern is different elsewhere.

At one fifth the size of acute inpatient care and double the size of outpatient care, sub-acute and non-acute care represents a significant health investment in Australia. It is appropriate that attention now focuses on the development of appropriate classification and funding models for this vital component of health services in Australia.

1.3 Australian studies to date

Australian studies into casemix classification of sub-acute and non-acute care have been limited to date in their sample size and client composition. These include:

- the Non-Acute Inpatient Project (NAIP)[3]
- the Western Australian Palliative Care Casemix Project sponsored by the Australian Association of Hospice and Palliative Care[4]
- the Victorian Palliative Care study[5]
- the Victorian Rehabilitation study[6 7]
- the National Community Home Nursing Study[8]
- the NSW Casemix Area Network SACAN study[9]

- two studies into sub-acute casemix in the Illawarra[10 11] and
- one study undertaken at Royal Rehabilitation Centre Sydney[12].

1.3.1 The NAIP

The Non-Acute Inpatient Study (known as the NAIP study) developed a classification system based on data collected from rehabilitation and slow stream medical wards. A per diem classification with 19 major functional categories was developed. Major classes are split using the RUG-ADL score.

The study found that the RUG-ADL score alone explained 44% of variance in cost per day. This was not acceptable to clinicians as it lacked clinical meaning. The addition of the major functional categories negated this problem. However, the variance explained dropped to 26.15%. It was noted that the RUG-ADL does not include cognition. Consequently, the Folstein Mini-Mental State was also collected.

1.3.2 The WA Palliative Care Study

The Western Australia Palliative Care Project collected clinical data on patients with the aim to test and refine a classification developed by the AAHPC. The scope of the study was palliative care clients in metropolitan Perth treated by Silver Chain Hospice Care Service (domiciliary), Cottage Hospice (hospice) and Hollywood Hospital (teaching hospital). All clients registered with these services during the study period (even if admitted before the study commenced or discharged after the study concluded) were in scope.

The sample consisted of 622 cases and the dependent variable was direct costs per day. The results suggest that the individual variables of most benefit in variance reduction were:

Phase	33.7%
RUG - ADL (total)	25.9%
Symptom severity (total) -	10.6%

Multi-variable splits using these three variables were the most effective. First level splits were by phase, second level splits were by either RUG-ADL scores or by symptom severity with either giving similar results (approximately 40% variance reduction).

1.3.3 The Victorian Palliative Care Study

The 1994 Victorian Palliative Care Casemix Development Project also completed a preliminary analysis of data collected from the six inpatient sites in scope. A second study is now in progress. The reduction in variance for the variables in the 1994 project were:

Phase	16.0%
RUG-ADL	15.0%
Symptom severity	11.0%

Like the Western Australian study, the preliminary analysis indicated that the stage of the illness, RUG-ADL on admission and number and severity of problems were the major indicators of resource consumption.

1.3.4 The Victorian Rehabilitation Study

Results are available for the first and second phases of the Victorian Rehabilitation Casemix Project.

Stage 1 involved a pilot study and an analysis of data collected from five inpatient units. The preferred model after preliminary analysis was a classification system based on sixteen major clinical groups (similar to Functional Impairment Categories). Change in functional status between admission and discharge (as measured by the Barthel Index) was predictive of variance in length of stay.

Stage 2 involved data collection in 8 rehabilitation units over 4 months and analysis of 715 episodes. Three classification trees were proposed with the best statistical result being a classification with 17 classes and a reported variance reduction of 17%. Splits are based on impairment type and functional score at admission. The stroke branch has 4 classes and has splits based on both functional score and change in functional score.

1.3.5 The Community Home Nursing Groups Study

This study examined resource consumption patterns in domiciliary nursing. Data were collected from 13 organisations over a 12 week period. The study data base included 95,737 visits and 6,685 episodes.

It proposed an episode based classification with 49 classes. First level splits were based on episode type (including Palliative care and Support and maintenance). Second level splits for these episode types were based on level of function. Final splits were based on intervention type. The proposed classification achieved a variance reduction of 29.2%. A validation study is now in progress.

1.3.6 The NSW CAN SNAP Version 1 Study

The NSW Casemix Area Network (CAN) conducted a major study (the Sub-Acute Casemix Area Network or SACAN project) to develop a casemix classification for sub-acute and non-acute inpatient care (rehabilitation, palliative care, some psychogeriatric care and sub-acute medical care). The study analysed 6,760 inpatient episodes.

The results confirmed that the individual variables used in DRG assignment performed poorly with this patient population:

Variable	Per diem variance explained	Per episode variance explained
Age		3.4%
Number of diagnoses	2.5%	2.5%
Principal diagnosis, excl. V-codes	...	1.2%
Principal diagnosis, incl. V-codes	...	5.6%
Discharge destination	1.9%	1.9%
	4.3%	

1.3.6.1 NSW nursing home, convalescence, respite and psycho-geriatric episode types

The sample sizes for each of these episode types were limited: 317 cases for nursing home types, 305 cases for both convalescence and respite, and 148 cases for psycho-geriatric. For cost per day, the functional dependency measures (excluding RUG-ADL) had only limited ability to explain resource use. Folstein's Mini-Mental scale performed well in explaining cost variation between psycho-geriatric patients. However, the number of observations within each partition is small. Splitting these episodes

by RUG-ADL (admission) gave preliminary statistical results of 43.4%, 41.8%, 34.9% and 27.0% respectively.

1.3.6.2 NSW palliative care episodes

Data on palliative care were collected in two formats: by episode of care; and by phase. Each episode can contain one or more of the five phase categories. The episode and phase data sets contained 1,206 and 3,014 cases respectively. The results suggest that the individual variables of most benefit in variance reduction were:

Phase	25.3%
RUG - ADL (total)	38.9%
Symptom severity (total)	27.9%

1.3.6.3 NSW rehabilitation episodes

The 2,862 patients classified as rehabilitation formed the largest subset of the NSW sub-acute episode types. Both the Functional Independence Measure (FIM) and the Barthel Index were optional data items. The FIM was undertaken on 1158 episodes, whilst only 38 episodes had a Barthel score recorded. In consequence, the Barthel was excluded from detailed analysis.

Data on Functional Impairment Category (FIC) were collected for each episode. The explanatory power of the FIC increased at each level of detail used. The overall power was reasonable, though not as good as the FIM. The FIM scores recorded on admission explained a significant amount of variation in the mean cost per day. For example, within the stroke sample, the FIM motor component explained 33%, while the total FIM explained 34%.

The results suggest that the individual variables of most benefit in variance reduction were:

Age	9.0%
FIC, all detail	16.4%
FIM motor, admission	21.3%
FIM motor, discharge	20.0%
FIM cognitive, admission	10.2%
FIM cognitive, discharge	10.3%

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A high level of consistency has emerged from these studies. All studies have identified a consistent set of variables which are able to explain a significant proportion of the reported levels of resource use on a per diem basis. To date, all studies with the exception of the home nursing study have used patient/client characteristics rather than intervention types as splitting variables.

The patient/client variables are:

- case type,
- functional dependency level,
- impairment type (for rehabilitation only),
- phase (for palliation only) and
- severity (for palliation only).

The studies have demonstrated results which are consistent with the international literature. Importantly, the key variables used in DRG assignment (age, diagnoses, number of diagnoses, source of referral, and destination after discharge) have performed poorly in all studies. These

findings are consistent with international experience and suggest that a different approach is required for the classification of sub-acute and non-acute care.

1.4 Project scope

The full range of sub-acute and non-acute care is included in this study. Five ***Case Types*** and four ***Episode Types*** are included. They are shown in Figure 1.

Figure 1 The Scope of the National SNAP Study

		EPISODE TYPE			
		Overnight patient	Same day patient	Outpatient	Community client
CASE TYPE	Palliative care	U	U	U	U
	Rehabilitation	U	U	U	U
	Psychogeriatric	U	U	U	U
	Geriatric evaluation and management	U	U	U	U
	Maintenance care	U	U	U	U

A stratified sample of admitted patient services is included from each State and Territory. The scope of the study also includes selective sites in New Zealand. In addition, other treatment settings are included in all States and Territories and in New Zealand. This includes same day admitted patients, outpatients and community clients.

The definitions of the five Case Types and the four Episode Types are included in Appendix 4.

2 Selection of study sites and study preparation

2.1 Sampling

The National Steering Committee agreed on the criteria for the selection of sites and resolved that site selection would be undertaken by each participating State / Territory and by the private sector. Each State/Territory undertook to select a study sample that reflected the configuration of services in that State/Territory and that met the criteria. This occurred as agreed with the exception that the selection of Victorian public sector sites was undertaken by the study team. The criteria for site selection were:

I Case Types

All five Case Types were included in the sampling criteria. The "population" for stratification was based on the estimated volume (bed days for admitted patients and episodes [however locally defined] for non-admitted) of each Case Type in each State / Territory and in the private sector.

If relevant information was not available at the State/Territory/Private sector level, a default population profile was agreed for admitted patients. The default was derived by combining data from the NSW inpatients statistics collection (1994/95) with the Victorian data on Extended Care Centres (1994/95):

Rehabilitation	40%
Palliative care	10%
Psychogeriatric	4%
GEM	16%
Maintenance	30%

The figure for psychogeriatrics was known to be significantly underestimated in the NSW data set and local estimates were to be used if available. Known high cost/low volume cases were to be over-sampled. Previous studies have identified two high cost/low volume case types - rehabilitation for traumatic brain dysfunction and traumatic spinal dysfunction.

ii Urban/rural

Urban and rural sites were to be included in proportion to population. The estimated percentages by State/Territory are shown in Figure 2:

Figure 2 Population By Location Used For Sampling

State/Territory	Capital	Major urban	Rural	Remote
NSW	62.8	9.8	25.9	1.5
VIC	70.3	3.4	24.8	1.4
QLD	44.8	19.6	31.8	3.8
SA	73.0	0	23.6	3.5
WA	73.0	0	17.8	9.3
TAS	40.2	20.5	33.6	5.8
NT	46.6	0	5.4	47.9
ACT	99.6	0	0.4	0

iii States/Territories

In relation to the overnight patient sample, States/Territories were to be included in proportion to population. This criterion was not applied to the sampling of other episodes. The percentage of population in each State / Territory is shown in Figure 3:

Figure 3 Population by State / Territory Used for Sampling Oernight Episodes

State / Territory	% of population
New South Wales	34
Victoria	25
Queensland	17
Western Australia	10
South Australia	8
Tasmania	3
Australian Capital Territory	2
Northern Territory	1

iv Indicative treatment settings

Two setting classes were used for sampling purposes - admitted patient and ambulatory (community and outpatient). In the absence of reliable data on sub-acute and non-acute community or outpatient care by Case Type, the proportion of Case Types was estimated by the National Clinical Project Team. The estimates by the clinical project team of the proportion of episodes by Case Type by treatment settings are shown in Figure 4:

Figure 4 Population Estimates of Proportion of Admitted and Ambulatory Care

	% admitted	% ambulatory	% total
Palliative care	60	40	100
Rehabilitation	90	10	100
Psychogeriatric	70	30	100
GEM	70	30	100
Maintenance	30	70	100

All other factors being equal, priority was to be given to ambulatory services located in the same geographic area as inpatient sites included in the study. This approach recognised that many providers work across settings. It also maximised the opportunity to track cases across settings.

Hospital sites were further stratified based on the percentage of sub-acute and non-acute bed-days by hospital type:

- principal referral (teaching)
- district and
- specialised.

If this information was not available at the State/Territory/sector level, the NSW data (1994/95) shown in Figure 5 was the default:

Figure 5 Percentage of Beddays by Hospital Type, NSW (1994/95)

Hospital type	Percentage of all sub-acute and non-acute beddays
Principal referral hospitals	8.5
Major referral hospitals	6.9
Major rural base hospitals	2.3
District hospitals	17.7
Small community hospitals	12.6
Designated sub-acute and non-acute hospitals	52.0
TOTAL	100

v Private/public sector

All community sites were to be publicly funded services. Sites providing admitted patient services were to be both public and private hospitals. It could not be assumed that the proportion of total beds in the two sectors represented the proportion of sub-acute and non-acute care in each sector. In addition, information by Case Type was not available except for rehabilitation. Therefore, sector was not used as a variable for sample selection.

vi New Zealand sites

The participating New Zealand study sites were not required to be a stratified sample of New Zealand services. Nevertheless, they were to include all five Case Types and both inpatient and community care.

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The outcome of this process was the selection of 104 sites. They are listed in Appendix 6 and represent:

- Public hospitals, including principal referral hospitals, major referral hospitals, major rural base hospitals, district hospitals, small community hospitals and designated hospices, rehabilitation centres and other sub-acute and non-acute hospitals;
- Private hospitals, including designated hospices, rehabilitation centres and general hospitals
- Community health centres, domiciliary nursing services and other community care agencies.

2.2 Clinical data collection design

The clinical data items to be collected in the study were developed by the research team and the Clinical Project Team in conjunction with the National Steering Committee. The variables and the instruments chosen were the best of those available that met the following criteria:

- the patient attribute to be measured is predictive of the need for, and cost of, health care
- the instrument produces reliable results
- the instrument produces valid results
- the instrument is valuable in its own right, sensitive to clinical change, and therefore potentially useful as an outcome measure
- the items to be collected place minimal demand upon participating clinicians.

The selection of some items was straightforward (for example, need for interpreter). Others were the subject of considerable controversy, debate and review. They included items where there was more than one instrument that met the criteria (for example, the measure of function to be used) and items where no suitable measure could be identified (for example, a valid and reliable measure of carer availability and adequacy). Some items and instruments were excluded because they were assessed to be too time-consuming to complete (for example, the Functional Assessment Measure [FAM]) or because they were condition-specific (for example, a Post Traumatic Amnesia measure for brain injury).

By the end of this process, nine instruments were selected for use in the study and a standard set of patient identifiers and service details was agreed. In addition, information on diagnoses and procedures would be extracted from hospital morbidity collections at the end of the study. Whilst all of the instruments selected were considered to be the best available at the time, the team recognised that some were less than ideal and that further work is required on the development of appropriate instruments.

The instruments adopted for the study were:

- functional measurement by use of the Functional Independence Measure (FIM)[13] and the Resource Utilisation Groups Activities of Daily Living scale (RUG-ADL)[14]. The paediatric version of the FIM would be used for children (the Wee FIM)[15];

- measurement of cognition by use of the Folstein Mini Mental State Examination (MMSE)[16];

- measurement of behaviour by use of the behaviour items from the Resident Classification Instrument (RCI)[17];

- measurement of palliative care stage and severity by use of the AAHPC Palliative Care Phase and the AAHPC Severity Score[18];

- measurement of psychogeriatric severity and function by use of the Health of the Nation Outcome Scale (HoNOS)[19];

- coding of impairment by use of UDS Functional Impairment Codes Version 4.0[20];

No consensus could be reached on a standard measure of function to be used for Rehabilitation and Geriatric Evaluation and Management. It was agreed that the FIM would be the preferred tool for the study. However, sites already using the Barthel Index were given the option of using a combination of the Barthel Index and the RUG-ADL instead of the FIM. In these cases, sites were required to record both the patient score and the maximum possible score for the particular version in use. Barthel scores were converted to percentages to allow comparability across different versions of the Barthel instrument.

Several data items were considered but were not adopted for use in the study. They were:

1. **Language spoken**
   This item was considered in order to assess whether people who do not speak English have a different pattern of resource use. Instead, the study captured 'Need for interpreter services as perceived by the person' on the basis that this item would be a better predictor of resource consumption.

2. **Availability of Carer**
   This item was suggested on the basis that carer availability affects resource consumption. The committee considered that, if this item was captured, it should not just ask whether the person lives alone but rather whether there are people who are both willing and capable of undertaking the carer role. The item was rejected because no validated measurement instruments could be identified. Two previous studies have found no difference between the resource consumption of people with and without carers[21 22] and the team considered that the item should not be re-tested until a suitable instrument was developed.

3. **Usage of other health and community services by community clients**
   The reason for considering this item is that community clients may receive services from more than one agency and that patterns of multiple service usage may confound the results. It was rejected on the basis that, in the absence of validated instruments, there is no way to measure and analyse usage of other services - it is unclear whether the issue is the number of other services, the adequacy of services or the degree to which services are substitutable.

4. **Ethnicity/Country of Birth**
   The committee considered that the sample size would be insufficient to allow the analysis of country of birth data. However, it was agreed that the health needs of the Aboriginal and Torres Strait Islander communities represent a special case and that patients from these communities should be separately identified. An equivalent item 'Maori or Pacific Islander as identified by the person' was to be collected by the New Zealand sites.

5. **Instrumental ADLs (eg. medication management; food preparation etc.)**
   The reason for considering this item is that the self-care Activities of Daily Living scales (whether measured by the RUG-ADL, Barthel or FIM) may not be sufficient measures for use in a community setting. The collection of instrumental ADLs was rejected because of the data collection burden for staff, the lack of a validated tool and the significant training implications of introducing a new measurement instrument to every site in the study.

6. **Social and environmental problems**
   A measure of social and environmental problems was suggested in order to determine the impact on resource consumption. It was agreed to adopt such a measure for palliative care episodes (the AAHPC Severity Scale) and psychogeriatric episodes (the HoNOS). Suitable measures could not be identified for the other Case Types.

7. **Quality of life**
   Consideration was given to the use of a quality of life measure. However, the item was rejected because of the data collection burden for staff, the lack of validated tools suitable for this population and the significant training implications.

8. **Intervention/procedure data**
   The question of whether the classification could include classes based not just on patient attributes but also on interventions was considered on the basis that interventions have been demonstrated to be predictive of costs. This would be the equivalent of the surgical classes in the AN-DRG classification. The committee's preferred position was that the classification should be based on patient, and not service, attributes. However, it was agreed to separately

identify patients seen for assessment only and patients receiving sole practitioner care only.

Having rejected the above items, the following items and instruments were agreed for collection. More detail about individual items can be found in the study manual that was subsequently prepared and distributed to all participating sites[23] . Copies of the data collection forms are included in the Appendices.

The first set of items consisted of information that was to be collected for all five Case Types. These data items are shown in Figure 6.

Figure 6 Common Data Items for the Five Case Types

IDENTIFIERS	SOCIO-DEMOGRAPHIC	EPISODE DETAILS
Patient/client number	Date of birth	Episode type
		Episode start date
		Assessment only
Patient/client name (for site use only - to be deleted before Data are sent to the study team)	Need for Interpreter service	Reason for episode start
		Leave days (admitted patients only).
Medicare number (for use as an identifier by study team only - to be deleted before de-identified Data are provided to health authorities)	Aboriginality	Sole Practitioner Intervention
		Episode end date
		Reason for episode end

The second set were data items specific to one or more Case Types. These items are shown in Figure 7.

It was also necessary to resolve what to collect on patients receiving either acute and/or primary care by services within the study as these patients needed to be identified and separately costed so that their costs could be excluded from the analyses. To this end, it was agreed to collect a small data set on patients/clients who would be out of scope for the study but who were receiving acute care in a ward participating in the study or who were receiving non-admitted primary or acute care from a team of providers participating in the study. The data items to be collected were:

- Patient/client identifier
- Date of birth
- Episode type
- Medicare number
- Episode start date
- Episode end date

Figure 7 Specific Data Items for Each of the Five Case Types

Palliative Care	**Rehabilitation**	Psychogeriatric	Geriatric Evaluation and Management	Maintenance
Episode start RUG-ADL score	Episode start FIM score **or** Barthel score **with** RUG-ADL score	Episode start RUG-ADL score	Episode start FIM score **or** Barthel score **with** RUG-ADL score	Episode start RUG-ADL score
Palliative Care Phase (Stable, Unstable, Deteriorating, Terminal and Bereaved)	Impairment code	Psychogeriatric phase (Acute, Rehabilitation, Consolidation, Monitoring and follow-up)	Impairment code	Type of maintenance care (Convalescent, Respite, Nursing Home Type, Community maintenance care, Other)
Problem Severity Score (Pain, Other Symptom, Psychological/ spiritual, Family/ Carer)	Compensable status	Diagnosis, pick list of 9		Diagnosis, pick list of 10 (Victorian ACAT list)
	First episode for this impairment.	First episode for this impairment		
Phase Change	Behaviour Scale	Behaviour Scale	Behaviour Scale	Behaviour Scale
Episode end RUG-ADL Score	Mini Mental State Examination (MMSE)	Mini Mental State Examination (MMSE)	Mini Mental State Examination (MMSE)	Mini Mental State Examination (MMSE)
	Episode end FIM score **or** Barthel score **with** RUG-ADL score	Health of the Nation Outcome Scale (HoNOS)	Episode end FIM score **or** Barthel score **with** RUG-ADL score	Episode end RUG-ADL score
		Episode end RUG-ADL score		

2.3 Piloting of data items and definitions

Only two items to be used in the study were not in common usage or had not been used in previous studies. With the exception of these two items, the data items to be collected were regarded as having been adequately 'piloted' for the purposes of the National SNAP Study.

The definitions of the five Case Types were developed specifically for this study and it was necessary to test their inter-rater reliability. In addition, previous studies had suggested that the definition of Palliative Care Phase required some clarification for consistent application.

2.3.1 The five SNAP Case Types

An inter-rater study of the definitions of the five Case Types was undertaken in March 1996[24]. In addition to testing inter-rater reliability, the purpose of the study was also to ascertain the views of clinical assessors regarding the adequacy of the Case Type definitions for the classification of sub-

acute and non-acute patients and to assess the goodness of fit of the definitions.

Data were collected at ten hospitals and two community health services providing a range of rehabilitation, aged care, and community care services. The participating sites were:

- Calvary Hospital (NSW),
- Cedar Court Rehabilitation Centre (Victoria),
- Coledale Hospital (NSW),
- Greenwich Hospital (NSW),
- Hampstead Centre (South Australia),
- Illawarra Regional Hospital (NSW),
- Illawarra Community Health (NSW),
- Lady Davidson Hospital (NSW),
- North West Hospital (Victoria),
- Royal Adelaide Hospital (South Australia),
- Royal Talbot Hospital (Victoria), and
- Silver Chain Community Nursing Service (Western Australia).

A study coordinator at each site provided instructions to raters and managed the on-site data collection. Site coordinators selected two clinical staff from each ward/service to participate in the pilot study. The clinical staff members acting as raters included registered nurses, specialist medical staff, medical registrars, and allied health staff.

Each patient on the ward/receiving care was assessed independently by the two clinical raters and allocated to one of the five SNAP Case Types. Each assessment was made by each rater without discussion with the other rater. Both assessments were completed within the one 24 hour period. Single assessments were collected for any patient/community client who was seen by only one practitioner on the day of assessment.

The site coordinators provided each rater with the definitions of each Case Type and ensured that they were familiar with the Case Type assignment logic. After the data had been collected, clinical assessors were interviewed, either individually or in a group, by the site coordinator to identify any problems experienced in undertaking the required tasks and any suggestions for improving the wording of the definitions. These were documented and provided to the Study Team.

In total, 683 patients were classified to one of the five Case Types. Of this total number, 559 patients (81.8%) were assessed by two raters and 124 (18.2%) by one rater. The ratings for the 559 patients assessed by two raters are given in Figure 8. Figure 8 also shows each combination as a percentage of total observations. There was a perfect match for 496 or 88.7% of patients. For the remaining 63 or 11.3% of patients, the largest number of mismatches are between Rehabilitation and Geriatric Evaluation and Management (19 or 3.4% of total observations) and Rehabilitation and Maintenance (18 or 3.2%). However, there were also a small number of mismatches for all other combinations except palliative care and rehabilitation.

The kappa statistic (?) was used to determine the significance of the level of agreement between raters. The kappa co-efficient of agreement is the ratio of the proportion of times that the raters agree (corrected for chance agreement) to the proportion of times that the raters could agree (corrected for chance agreement). The value of kappa was 0.838 with a 95% confidence interval of 0.801 to 0.875.

Each rater used a scale of 0 to 4 to indicate how well each Case Type described the key attributes or characteristics of each patient. A score of 0 indicated ‘Very Poor Fit’ and a score of 4 indicated ‘Very Good Fit’. The average goodness of fit score was 3.48 indicating that there was a good fit for most patients. The Maintenance Case Type had the best fit score (3.70) and the Geriatric Evaluation and Management Case Type had the lowest fit score (3.27).

Figure 8 Results of Two Rater Assessments of the Five Case Types

		Rater one					
		Palliative Care	Rehab.	Psycho-geriatric	G. E. M	Maintenance	**TOTAL**
Rater Two	Palliative care	**21 (3.76%)**	0	1 (0.18%)	1 (0.18%)	4 (0.72%)	**27**
	Rehab.		**232 (41.50%)**	2 (0.36%)	19 (3.40%)	18 (3.18%)	**271**
	Psycho-geriatric			**41 (7.33%)**	2 (0.36%)	4 (0.72%)	**47**
	GEM				**85 (15.21%)**	12 (2.15%)	**97**
	Maint.					**117 (20.93%)**	**117**
	TOTAL	**21**	**232**	**44**	**107**	**155**	**559**

Each rater also used a scale of 0 to 4 to indicate how easy it was to assign each patient to a Case Type. A score of 0 indicated 'Very Easy' and a score of 4 indicated 'Very Difficult'. The average ease score was 0.91 indicating that there were no significant difficulties assigning sub-acute and non-acute patients to one of the five Case Types. With a score of 0.54, the Psychogeriatric Case Type had the best ease score and the Geriatric Evaluation and Management Case Type had the lowest ease score (1.15).

The kappa value indicated that, within any one service, the five Case Types had very good inter-rater reliability and the results supported the use of the five Case Types in the National SNAP Study. All five Case Types proved to be reliable, there was a good fit for most patients, and staff found the definitions easy to use. On this basis, the definitions were adopted for used in the National SNAP Study.

2.3.2 Palliative Care Phase

The definitions of the five Palliative Care Phases were revised by the Australian Association for Hospice and Palliative Care, the National Palliative Care Casemix Reference Group and palliative care clinicians around Australia. These revised definitions were tested for inter-rater reliability in a study conducted in early 1996.[25]

The study included palliative care patients in both inpatient (both hospice and hospital units) and community settings. They included both the public and private sectors.

Sixty raters participated in the study. They were located in six services in five States. Between them, they provided a total of 1,548 separate assessments. Each patient was assessed independently by two or more raters on the same day. The mean level of agreement was 0.736.

Following clinical consultation and feedback from the study, the AAHPC changed the nomenclature of one phase (from 'Acute' to 'Unstable') and altered the order of the phases. This nomenclature and order was then adopted for use in the National SNAP study.

2.3.3 Pilot of the full data set

The clinical and the staff time data collection instruments were piloted at four sites prior to the study start. The pilot sites were the Prince Charles Hospital (Brisbane), the Cedar Court Rehabilitation Centre (Melbourne), Hampstead Centre (Adelaide) and the Lady Davidson Hospital (Sydney).

No major changes to the methodology were required as a result of the pilots. However, the staff time collection form was amended by the inclusion of a row to capture staff time spent with out-of-scope patients in out-of-scope settings (eg a rehabilitation physician at one of the pilot sites spends a considerable amount of time working with spinal injury patients in the intensive care unit of another hospital) and several issues were identified that needed to be highlighted in training (eg how to score the MMSE when patients have a physical condition that prevents them completing some items; the definition of clinical travel time). In addition, a more detailed version of the staff time collection form was developed at the request of one site and equivalent changes made in *SNAPware.*

2.4 Ethics Committee approval

The project methodology was approved by the Ethics Committee of the University of Wollongong. The project team also provided written material for submission to Ethics Committees of the participating sites.

2.5 Training of participating sites

Four types of training services were offered to study sites, the most resource intensive being on-site training. On site training was provided to all sites and occurred over a four month period. Members of the project team, in conjunction with the State coordinators, visited all sites before the study start date and met with clinical and non-clinical staff to discuss the specific data requirements of the study and address particular issues that arose for sites. A formal training program was provided at each site. Further site visits occurred throughout the study period as required.

The second training medium was video. The SNAP training team made a 45 minute video to ensure that all staff in participating sites, including night staff and weekend staff, had access to information on the purpose of the study and what was required of participating staff. The video was distributed to all sites in time to ensure that it could be seen by all relevant staff.

The third type of training offered to study sites was training in the use of the Functional Independence Measure (FIM). FIM training was provided to all sites who had elected to use the FIM but did not have accredited FIM staff. This training was provided by a network of accredited FIM trainers from NSW and Victoria. In total, the study provided the opportunity for 30 services to receive accredited FIM training.

Finally, informal training was provided on an ‘as required’ basis through the 24 hour SNAP telephone hot line. Most of this training focussed on basic computer skills such as back-up procedures, file restructuring, Windows™ operations and program maintenance.

The team formally evaluated the on site training program by use of a five point Likert Scale in which 5 indicated a good understanding of the topic and 1 a poor understanding of the topic. The key findings from the evaluation are shown in Figure 9.

Figure 9 Summary of Evaluation of Training Sessions

Question		Average Score	Best Score Possible
1	I gained a general understanding of the project	4.25	5
2	I understand why this project is being undertaken	4.48	5
3	I understand the clinical data items and how they are to be collected	4.02	5
4	I understand my role in the collection of staff time	4.20	5
8	I think that the hospital/service that I work in should participate in this project	YES - 90.6% NO or Left Blank - 9.4%	

There was significant support from clinicians in participating sites, with over 90% of participants stating that they believed that their service should participate in the study. This level of support was regarded by the study team as a critical success factor for the study.

2.6 Design and installation of *SNAPware*

A purpose designed software package (*SNAPware)* was developed for use as a database management tool during the project. It was installed at every site participating in the study.

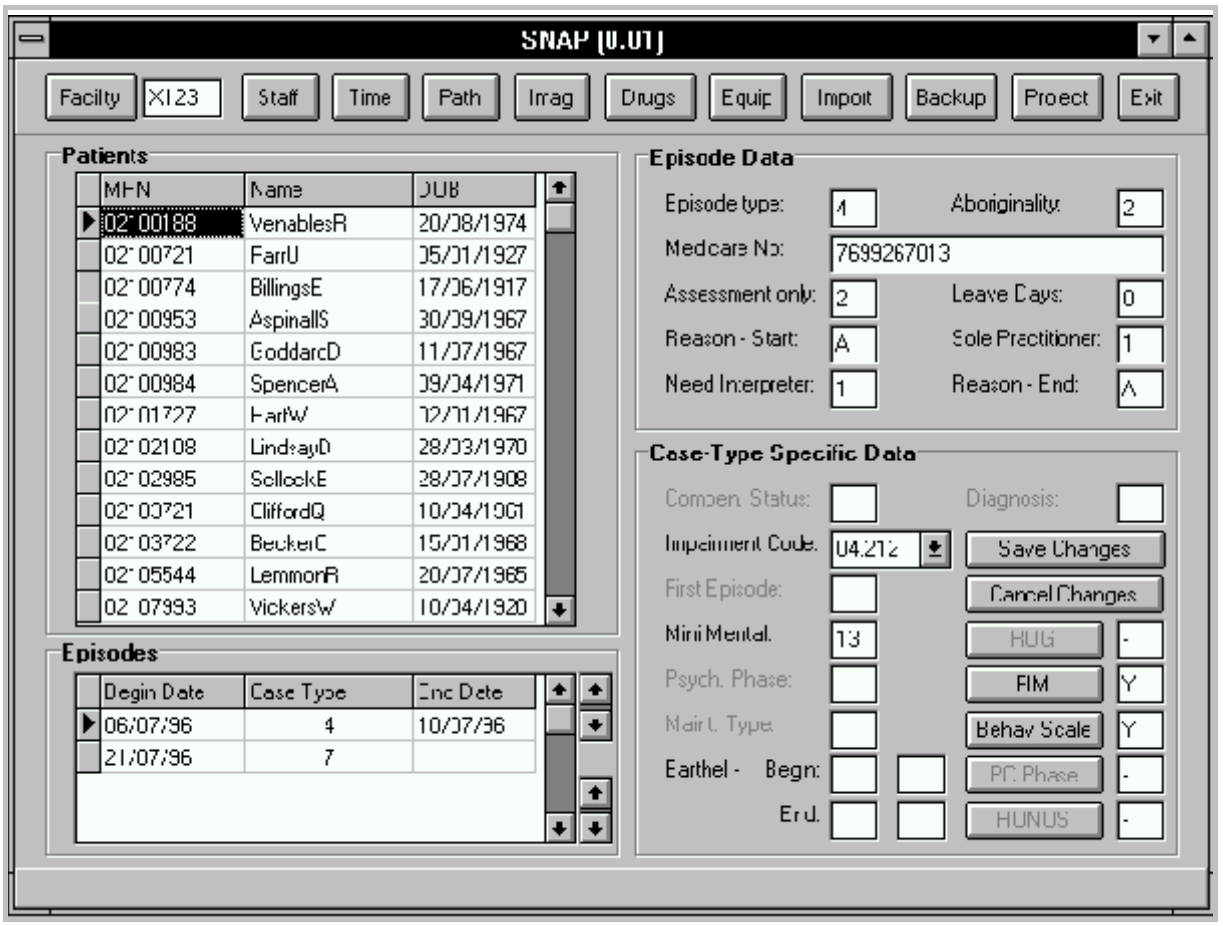
The *SNAPware* package was designed so that it could be easily used by individuals with little computing expertise and required little training prior to operation. Throughout the project, the necessary support facilities for the software were provided by the project team via a 24 hour hot-line telephone service.

SNAPware was designed to perform the following functions:

- register patients into the study;
- enter patient episode data;
- identify patients with incomplete data;
- enter staff time by patient by shift and by day as well as total time on duty and time spent on all other activities (such as teaching, research and health promotion);
- enter staff into the study and identify them by designation and cost centre;
- enter other service utilisation data by patient by day (pathology, imaging, pharmacy, atypical goods and services);
- import service utilisation data where such data was available in other computer systems;
- count and sort patient and service utilisation records;
- remove patient names prior to sites submitting the completed data to the study team.

SNAPware was designed to run on minimal Windows ™ configuration. An example of *SNAPware* is shown in Figure 10. The minimal hardware configuration is a 386 PC running Windows 3.1 or later with 8 megabytes of RAM. A detailed *SNAPware* User's Guide was also distributed to all participating sites. At the end of the study, sites retained the software for their own use.

Figure 10 Example of *SNAPware* - the main screen



Validation of the data could be undertaken via inbuilt checking mechanisms which ensured that the software accepted only valid information. Information entered into the system by whatever means must therefore be capable of passing rigorous edit checks.

3 Data collection

3.1 Clinical data collection

Data collection commenced in the first 75 sites at midnight on 1 July 1996. The bulk of the remaining sites commenced collection on 1 August 1996 with two sites commencing on 1 September. The collection of clinical data continued on the following basis:

- Sites commencing 1 July 1996 continued to collect service utilisation data until 30 September 1996 (92 days). These sites then continued to collect clinical discharge data on all patients still in care until 31 October 1996. The discharge data set was completed on 31 October 1996 for all patients still in receipt of care with the reason for episode end recorded as "still in care at end of the study".

- Sites commencing after 1 July 1996 followed the same data collection pattern. All but four sites collected clinical data for a minimum of three months. Three sites collected for eight weeks and one site for ten weeks.

- The initial study protocol proposed that specialist brain injury and spine injury units be invited to continue data collection for a further three months and that a decision be deferred until towards the end of the study so that study sites would be able to make an "informed choice" about whether they were able to continue. It was subsequently agreed that all sites able to do so would collect the full data set, including staff time and other costs, during the fourth month of data collection. A small number of these sites agreed to collected data through to 13 December 1996, making the maximum period of collection a total of 24 weeks. At that point, all patients still in care were discharged from the study and the discharge data set completed.

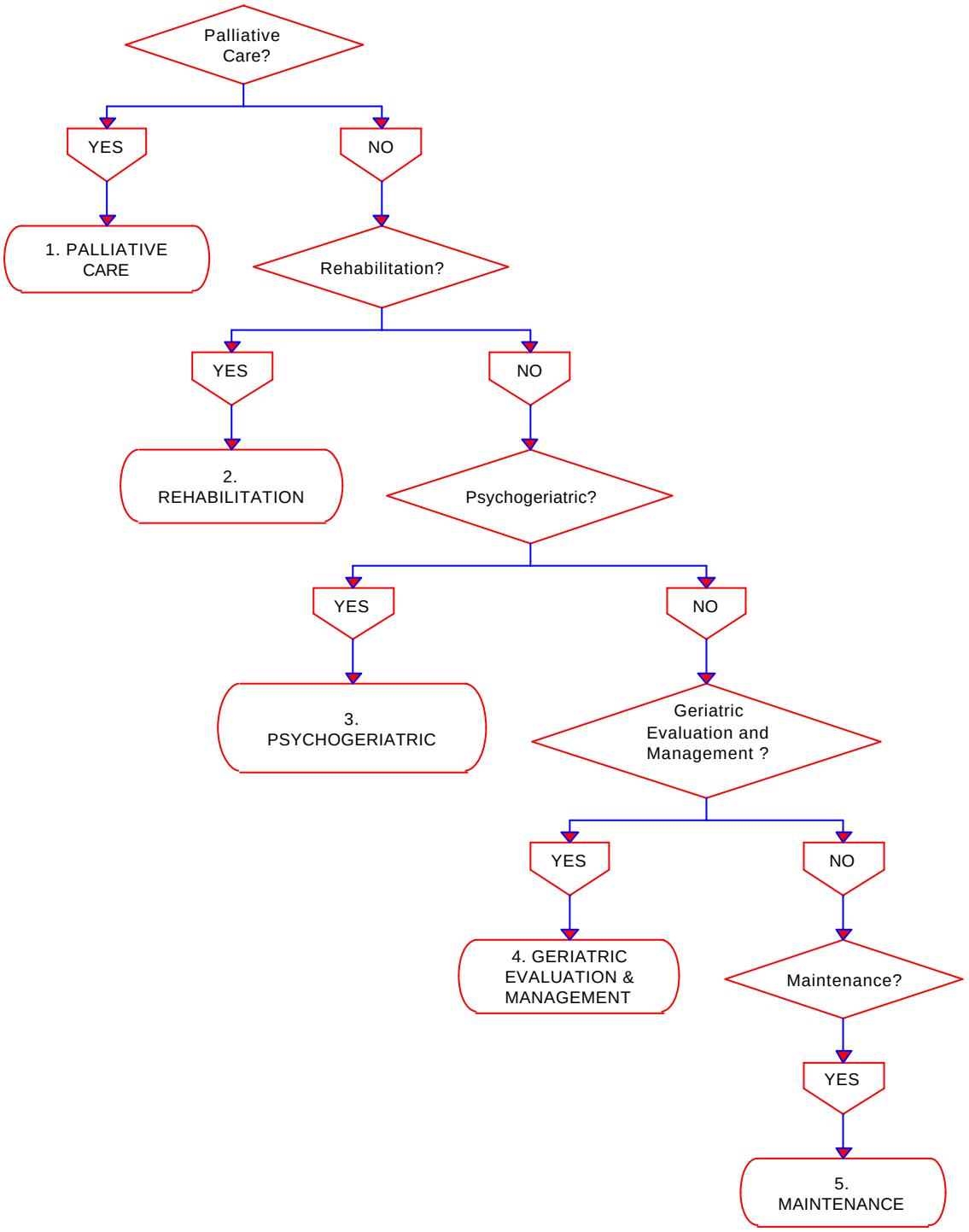
At the commencement of the data collection period all patients/clients receiving either Acute Care or Primary Care were registered into the study by the completion of a form designed specifically for this purpose. This form, "*Form 6: Data Items for Collection by the Clinical Team for Patients receiving either Primary Care or Acute Care*" is included in Appendix 5.

All sub-acute and non-acute patients/clients were then assigned to one, and only one, of the five SNAP Case Types. Study sites were instructed to use the definitions and the assignment algorithm given in the Study Clinical Handbook. This algorithm (called the *SNAP Decision Tree*) is shown in Figure 11. Patients/clients were assigned to a Case Type using the order reflected in the decision tree. If a patient/client met the criteria for more than one Case Type, the episode was to be allocated to the first Case Type in the tree. Staff were asked to classify the patient/client rather than the stream of care in which they work.

Each patient was then admitted to the study by using the appropriate form. These forms are included as Appendix 5. All patients/clients in receipt of care at study start were admitted to the study within the first two days of the study start (overnight patients) and the first two visits (all others). All subsequent patients/clients were admitted to the study within 24 hours of the start of their episode of care (overnight patients) or at the end of the first visit (all others).

The Episode Start data set were then completed for each patient/client. This was required within 24 hours or the first visit for Palliative Care. For other Case Types, the time requirements for Episode Start data varied. Most were required within the first 48 or 72 hours (overnights) or the first three visits (all others). If the patient Case Type changed during the study period, the Episode End data for the current episode were completed and the patient/client was admitted to a new Case Type. A new set of forms was completed for each Type Change.

THE DECISION TREE



If the patient died, was discharged or was transferred, the Episode End data set was completed. At the end of the study the Episode End data set was completed for all patients still in receipt of care.

Forms for each Case Type were consistently colour coded and numbered: 1 for Palliative Care (pink); 2 for Rehabilitation (FIM version in dark yellow, Barthel version in light yellow); 3 for Psychogeriatrics (mauve); 4 for Geriatric Evaluation and Management (FIM version in blue, Barthel version in green), 5 for Maintenance Care (cream) and 6 for primary and acute care (white).

The data collection instruments, the definitions of each data item, and the forms for each Case Type were included in the Clinical Handbook within the Study Manual distributed to all participating sites.

3.2 Service utilisation data collection

Study sites collected all required data to cost the care that each patient received on a daily basis. Data were collected for each day of care. This included data on staff time, diagnostic tests, aids and appliances and other goods and services.

Specifically staff were required to collect, for each patient, information which identified the type of staff delivering the service and the time taken in providing services to, or on behalf of, the patient. In addition, the cost of expensive and atypical goods and services, including diagnostic tests, was collected so that the costs could be attributed to each patient in scope.

3.2.1 Collection of staff time

The rules for collection of staff time were the same for all disciplines and the same for staff working in both hospitals and community services.

Study sites collected daily data on staff activities for the full three month study period. Whilst the broad activity categories were consistent across study sites, the format of the staff time collection did vary in some sites, depending upon existing data collection procedures. Where a site did not have an existing data collection procedure, a SNAP activity log captured all the required data.

Data collection commenced from midnight on 1 July 1996 and continued until midnight 30 September 1996 for the first group of sites. Data collection at the remaining sites commenced in August or September (see Section 3.1).

Some sites participating in the study were already collecting staff time data by way of their own in-house information system. In these situations, the automated record of the information required was down loaded into the site's own copy of *SNAPware*.

Study sites without automated staff information systems manually collected staff information for the duration of the study. The data collection forms used are included in Appendix 5.

Sites were given the option of using one of two staff time data collection forms. *Form S* contained the minimum information to be collected throughout the duration of the study. It collected information on patient attributable time, general clinical time and clinical travel time. All other time was recorded as 'other time'. *Form T* was an optional collection. *Form T* included provision for 'other time' to be collected by specific categories: - teaching, research, health promotion, other travel, quality improvement and administration. In the event, *Form T* was used by almost all sites.

Either *Form S* or *Form T* was completed by each staff member for every shift/day they worked, using the instructions on the back of the form. Both forms were available in bulk.

3.2.2 Pathology

Information was required in relation to each test ordered on patients in the study cohort for the following sub-disciplines:

- Anatomical Pathology;
- Biochemistry/Clinical Pharmacology;
- Cytogenetics;
- Immunology;
- Haematology;
- Microbiology.

Pathology services consumed by all patients in the study cohort (including those seen in the community) were in scope in this study if the costs of such pathology tests were met from within the budget of the participating study site. If the costs of pathology tests were met by another agency or the patient, the costs were out of scope.

Sites with automated pathology information systems down loaded the required information directly into *SNAPware*. At sites whose information systems could not provide this information, the information was recorded manually by site staff prior to entry into the study database. *Form P* was provided for these sites. It is included in Appendix 5.

The following data items were required in relation to each patient for whom pathology tests were ordered during the data collection period:

- The patient identification number;
- The date the service was provided;
- Name of the test performed;
- Frequency of tests performed;
- The code of the test performed (using either the Commonwealth Medical Benefits Schedule code (CMBS) or the WELCAN classification system).

3.2.3 Medical imaging

Information was required in relation to each test ordered on patients in the study cohort for the following sub-disciplines:

- Nuclear Medicine;
- Ultrasound;
- Computerised Tomography Scanning;
- Magnetic Resonance Imaging;
- General Radiology;
- Radiotherapy.

In addition, interventional radiology services were included such as neural ablations and drain insertions or exchanges to the extent that they occurred.

Imaging services consumed by all patients in the study cohort (including those seen in the community) were in scope in this study if the costs of such services were met from within the budget of the participating study site. If the costs of imaging services tests were met by another agency or the patient, the costs were out of scope.

As with pathology, sites with automated imaging information systems down loaded the required information directly into *SNAPware*. At sites whose information systems could not provide this information, the information was recorded manually by site staff. *Form I* was provided for these sites.

It is included in Appendix 5.

The following data items were collected on each patient for whom imaging services were ordered during the data collection period:

- The patient identification number
- The date the service was provided;
- Name of the service performed;
- Frequency of services performed;
- The code of the service performed (using the Commonwealth Medical Benefits Schedule system (CMBS)).

3.2.4 Atypical and expensive goods and services

In order to cost the care of each patient in the study cohort, it was necessary to record expensive or atypical goods and services provided to individual patients. All such costs were directly allocated to the individual patient. All remaining goods and services costs were then proportioned out across all patients.

Form G is included in Appendix 5 and was designed for the collection of such costs. Only supplies, equipment or services with a cost in excess of $50 needed to be recorded.

The items recorded were:

- **Prosthesis** Prosthetic devices with a cost in excess of $50.
- **Equipment** Other equipment with a cost in excess of $50.
- **Consumables** Consumables or aggregates of consumables used in one treatment session with a cost (individually or in aggregate) in excess of $50.
- **External Services** Health services provided by another health care provider and the costs are met by the study site (eg a palliative care patient receiving radiotherapy for pain relief and the costs are billed to the palliative care agency). The service was recorded only if the costs were met by the study site.
- **Transport** Ambulance or other patient transport services for an individual patient which were funded by the study site and with a cost in excess of $50 on any one day.
- **Other** Any other item with a cost in excess of $50.

Pharmacy costs were not manually recorded. Pharmacy information was collected only from study sites with automated pharmacy information systems and sites already able to allocate pharmacy costs to each patient.

3.3 Financial data collection

Data from two major sources were required for the costing process. The first related to resources consumed in each of the major clinical areas of service provided to patients in the study cohort. Nursing, allied health and medical clinicians recorded the number of minutes spent treating patients during each shift worked during the study period. In addition, data were obtained on clinical services such as radiology, pathology and pharmacy and high cost supplies. These collections were described in the previous section.

The second source of data required for the costing process comprised financial information relating to expenditure incurred during the study period. This information was extracted from sites' general ledgers in accordance with a standard cost centre structure that was developed for the purpose of the study (see Appendix 8). All cost centres are classified as either overhead cost centres or direct care cost centres.

During initial site visits the study team discussed the provision of the required cost centre information with site staff. Study sites were not required to amend their existing charts of accounts. The data collection instrument was designed to allow for the mapping of financial information to the study's standard chart of accounts.

Cost data were required from study sites for each overhead cost centre. Sites with clinical costing systems used existing allocation methods to allocate these to each direct care cost centre. Sites without clinical costing systems used one of the study overhead allocation statistics for this purpose. The list of SNAP allocation statistics is included as Appendix 9. Any sites that were unable to provide data corresponding to the preferred allocation statistic provided alternative data for this purpose. The project team worked with each study site during the initial site visits to develop the approach to be used by each site.

Cost data from the general ledger were also required on each direct care cost centre participating in the study. To account for the range of payments recorded against each cost centre, the study cost centre structure included a large amount of line item information. A standard set of definitions and recording rules were developed and distributed to all participating sites. These definitions are included in Appendix 4. The line item structure included:

- **Salaries and Wages** which included the costs of direct labour and periods of paid leave i.e. Annual Leave, Sick Leave, Long Service Leave. For those sites not reporting on an accrual basis, an adjustment for leave accruals within each cost centre was required;

- **Goods and Services,** including all other non salary related type payments, except medical and surgical supplies;

- **Medical and Surgical Supplies**;

- **Offsets** related to the process of offsetting the cost of providing a service with the revenue received. For example, revenue received from providing meals in the Staff Canteen was used to offset the cost of producing the meals;

- **Termination Leave** including the cost of leave paid on resignation/retirement/redundancy payments;

- **Capital**.

3.4 Data entry, data management and data audit during the collection

Section 2.6 outlined the design and installation of *SNAPware*. This purpose-built software was used by all sites for on site data entry and was upgraded during the course of the study. In total, six versions of *SNAPware* were developed:

Version 1.0
Test version

Version 1.1
First production version distributed to all sites.

Version 1.2
Added a Detailed Staff Time option which allowed a finer breakdown of staff time data to be captured. This Detailed Staff Time function was optional.

Version 1.21
Added a Field Masks option which allowed special formatting of fields such as date fields to be turned off. This version was distributed to any sites experiencing difficulty with keyboard locking during data entry.

Version 1.22
Modified the Facility file to reflect the final list of participating sites, allowed the patient list in the Staff Time screen to be sorted by Medical Record Number (MRN) and name and fixed minor errors in previous versions.

Version 1.23
Added facilities for importing staff time data by increasing the limit on the maximum shift minutes per staff member and including an option to automatically create staff records from the imported staff time data. This version was distributed to any sites experiencing difficulty with the importing of staff time.

Each version was accompanied by addendums to the *SNAPware* Users Manual. In addition, supplementary information was added to the manual as the study proceeded based on questions directed to the SNAP 24 hour telephone hot line. For example, additional information was issued on how to enter staff time for non-SNAP patients; on registering Palliative Care patients/episodes in care prior to study; on entering staff time after an episode has finished; on entering episodes with a start date prior to 01/01/1996 and on entering episode end RUG-ADL scores for same day palliative care patients.

All versions of *SNAPware* included a project screen which was used to set default values (such as the facility code and study start and end dates) and to count records in the main data files. This included a count of patients, episodes, phases, staff time, pathology, imaging, drugs and equipment. It also included a count of episodes without an end date, episodes with incomplete scores and staff without a cost centre.

SNAPware also included a backup screen which allowed the data to be backed up to either a floppy disk or another drive. The manual included detailed instructions on the required backup procedures. Two types of backup were included. The first was for local use. The second was for the creation of a file that could be sent to the study team. This option removed all patient names from the file prior to the data leaving the study site.

Data audits were conducted through the course of the study. These were undertaken by the national study team and by some State/Territory Coordinators and Site Coordinators.

A national SNAP staff activity audit was undertaken midway through the study by the national study team. This was an audit of staff time data collected at 17 sites. They comprised:

- three teaching hospitals;
- one affiliate teaching hospital;
- six specialist sub-acute care hospitals;
- two hospices;
- three district hospitals;
- two community care agencies.

The results of the audit are shown in Figure 12. Unreported staff time was equivalent to 3.4% of total staff time or approximately 15 minutes per staff member per day. Figure 12 also shows that patient attributable time comprised 54.6% of the total time reported.

Figure 12 Results of the Audit of Staff Time

Activity	***Time in minutes***	***% of time***
Patient specific time reported	6,010,719	54.61
General clinical time	2,677,193	24.32
Administration	1,318,497	11.98
Teaching	203,526	1.85
Clinical travel	172,966	1.57
Quality management	123,104	1.12
Other travel	48,576	0.44
Research	37,088	0.34
Health promotion	23,959	0.22
Other	15,687	0.14
SUMMARY:		
total on duty time	11,006,762	100.00
total time reported	10,631,313	96.59
total time not reported	375,449	3.41

In summary, the results of the review of staff time showed that the average staff member participating in the SNAP study spent their day as follows:

Patient specific time	4 hours 29 minutes
General clinical time	2 hours 2 minutes
Administration	48 minutes
Clinical travel	11 minutes
Teaching	9 minutes
Other	21 minutes

The 21 minutes of ‘other time’ includes time spent on research; quality management; health promotion and all other and unspecified time. Definitions of each activity category are included in Appendix 4.

3.5 Support to participating sites during the data collection

Participation in the National SNAP Project required a considerable investment of resources by study sites. For this reason, a project grant was made available by the Commonwealth Department of Health and Family Services and was distributed to participating agencies during the study. The funds were used to backfill positions, to purchase necessary technology or employ personnel to support the project. Travel associated with the project was also to be met from this source.

A detailed study manual was designed to address issues which arose during the course of the study. This manual was set out in five parts.

PART A provided an overview of the aims and objectives of the study, background information on recent casemix developments focussing on the area of sub-acute and non-acute care, and an overview of the study methodology.

PART B of the manual was **The Clinical Handbook**. It detailed the methodology used to capture data on the clinical attributes of patients treated at each of the participating sites. It defined each of the clinical data items and included copies of the patient data collection instruments. This part of the manual was designed for use by the clinical staff participating in the study.

PART C of the manual was **The Service Utilisation Data Handbook**. It detailed the methodology used to capture data on the resource consumption patterns of patients treated at each of the participating sites. It contained the requisite data specifications and defined the manner in which costs would be allocated to units of service provided. This part of the manual was also designed for use by the clinical staff participating in the study.

PART D was **The SNAP Costing Manual**. Part D provided details of the costing methodology. It included an overview of the methodology, outlined the method for the distribution of overheads and the allocation of direct costs to each patient in scope and listed the financial data required for the study.

PART E of the manual was **The *SNAPware* User Manual**. It provided an overview of the software to be used in the study *(SNAPware)*. This section included the software specifications and instructions for its use. It included instructions for the downloading of information from existing information systems.

The manual also contained an extensive set of appendices. They included the study chart of accounts and information on participating sites. The manual was prepared in loose leaf form. Updates as required were provided to study sites as the work progressed.

The National Study Team issued five ***National SNAP Project Newsletters*** during the study. They were distributed to all participating sites. The newsletters contained information on issues that arose during the study, contact details for study coordinators, two SNAP crossword puzzles (*SNAPWORD PUZZLES*), feedback on the sample and a national competition on ways to maintain motivation during the data collection period. First prize was a case of champagne. A sixth newsletter was also distributed after the analysis was completed.

A network of study coordinators was funded by States, Territories and the Commonwealth. They liaised between study sites and the project team and provided sites with assistance as required. Several coordinators also provided opportunities for staff from participating services to meet together and share ideas about local data collection systems. The list of jurisdiction coordinators is included as Appendix 3.

Each site nominated a study coordinator who was responsible for co-ordinating the data collection process, ensuring that information was disseminated in a timely fashion and assisting in the overall management of the project. Some larger sites appointed separate clinical and costing site

coordinators.
Finally, the national team ran a 24 hour telephone hot line service from 1 July 1996 until 13 December 1996. The hot line service was available to answer questions and to provide assistance with both the data collection and with *SNAPware.*

3.6 Site survey

A survey of participating sites was conducted at the end of the data collection period. The purpose of the survey was threefold. First, to help the research team to understand the services and the data collected during the study. Second, to collect information required to describe the services that participated in the study and, third, to ascertain the views of participating staff about the quality of the data collected during the study. This included the opportunity for sites to identify any collections where the quality of the data was questionable. Like the data itself, site-specific answers to the questions were confidential. A copy of the survey form is included as Appendix 11.

This section presents key findings from the site survey. The results include information provided by 73% of sites. No information was provided by the remaining sites. The results are based on the number of sites and are not weighted for the number of episodes at each site. Appendix 12 contains an analysis based on the delineated role of study sites as identified through the survey.

3.6.1 The role of participating services

Given the nature of this study, it was necessary to employ a standardised set of descriptors to describe the services in the sample. There are no such descriptors used on a national basis and similar services are described in different ways in each State and Territory and across the public and private sectors. In consequence, the study developed a four level description of the delineated role of participating services. The Queensland Guide to Role Delineation was used as the starting point in the development of these definitions. The definition of each level of service is included in Appendix 4 and in the survey included as Appendix 11.

An alternate approach would have been to describe the services according to whether they are teaching hospitals, district hospitals, rural base hospitals, specialist free-standing hospitals (includes hospices, extended care centres and rehabilitation centres) and community care agencies. This approach was not adopted. It was considered that this approach had less relevance to the services in scope for the SNAP study than it does for acute care. A further issue is that the boundary between the types of facilities is often unclear. For example, several hospitals in the study were specialist free-standing units of a teaching hospital. It was unclear whether these hospitals should be classified as teaching hospitals or as specialist free-standing hospitals.

Each participating service was asked to use the four level role delineation guide included in the survey and to define the level of service provided by units that had participated in the SNAP study. Some sites reported that they provided a different level of service for inpatients, outpatients and community. In these cases, each separate level has been included in the following results. A table of delineated episodes is shown in Appendix 12.

The percentage of sites providing each level of service is shown in Figure 13. 44% of sites provided no palliative care services. Sites with a recognised palliative care role included specialist palliative care services such as community palliative care teams and hospices. Some of these services were free-standing, others were co-located with rehabilitation and aged care services. These services were classified as either Level 2 or Level 3 services. The other services with a recognised palliative care role included generalist community health and nursing services and hospitals that provided a palliative care service as part of a broader (generally aged care) service. These services tended to be classified as Level 1 or 2.

69% of all sites had a recognised role in rehabilitation. The bulk (49%) of these recognised providers had a Level 2 service. 30% of the rehabilitation services were classified as Level 3 whilst 21% were Level 1 services. The majority of the Level 3 services were specialist rehabilitation hospitals and specialist community rehabilitation services.

Geriatric psychiatry was a recognised service in 25% of sites. Of this group, 59% provided a Level 1 service. The percentage of Level 3 services (17.6%) was the lowest of any of the five service types.

56% of sites had a recognised role in geriatric medicine. All but five of the sites that provided a Level 2 or 3 Geriatric Medicine service also provided a Level 2 or 3 Rehabilitation service.

22% of sites identified community health as a recognised role. Of these sites, 97% provided a Level 2 or 3 service. The majority of community health sites (56%) were specialist community health services whilst the remainder (44%) were integrated hospital and community health services.

Figure 13 Role of participating sites - percentages

	Level 1	Level 2	Level 3
Palliative Care	48.6	16.2	35.2
Rehabilitation	21.3	48.9	29.8
Geriatric Psychiatry	58.8	23.5	17.6
Geriatric Medicine	40.0	33.3	26.7
Community Health	6.7	60.0	33.3

Figure 14 shows the number of hospital beds included in the SNAP study. Again, this is based on information provided by 73% of sites. Less than 5% of beds were not designated as either palliative care, rehabilitation, geriatric psychiatry or geriatric medicine beds.

Figure 14 Hospital beds in SNAP study

Bed Type	Number	Percentage
Palliative Care	295	11.4
Rehabilitation	1,652	63.6
Geriatric psychiatry	131	5.1
Geriatric medicine	389	15.0
Non-designated	127	4.9
Total	**2,594**	**100**

Sites also reported that 74 different outpatient clinics and day programs were included in the study. The most frequently reported clinics and programs were physiotherapy clinics, rehabilitation clinics, pain clinics, fracture clinics, aged care assessment services (ACAT) and geriatric day hospitals.

The study team sought information on the hours of operation of community services. One concern was to ascertain further information on local service arrangements in cases where a site did not provide a 24 hour 7 day service. Specifically, to identify who provides coverage for patients/clients out of hours and to ascertain whether these services collected data on clients in the SNAP study.

Figure 15 shows the results from those sites that provided a community service. The majority (68%) of these sites provided a service only during business hours. 21% provided a 24 hour service.

Figure 15 Hours of operation of community sites in SNAP study

Hours of operation	Percentage
Business hours	68.4
Extended hours	10.5
24 hours	21.1

Figure 16 shows the results for palliative care sites that did not provide a 24 hour 7 day service. Most sites had a formal arrangement with another agency to provided 24 hour coverage. In the majority of cases, these other agencies collected data on clients in the SNAP study.

Figure 16 Data Collection by Other Agencies Providing After Hours Coverage for Community Palliative Care Sites in SNAP study

Hours of operation of participating site	Data (including phase change) collected by other agency		
	yes	no	total
Business hours	71%	29%	100%
Extended hours	0%	100%	100%

Palliative care services were asked whether they had a written policy on provision of bereavement support and bereavement counselling service. They were also asked to identify how long after the person has died that they continue to provide bereavement support (when the intervention is recorded on the patient record) and bereavement counselling (when a separate medical record is established for persons receiving bereavement counselling).

84% of palliative care sites had a formal policy on the provision of bereavement support and bereavement counselling. The majority provided such services for as long as they were required by the family and carers. In cases where sites had a policy on the duration of services provided, the shortest was 24 hours and the longest one year.

3.6.2 Site confidence in the accuracy of the data collection

A five point Likert Scale was used to ascertain the level of site confidence in the data collected during the course of the study. The results for the patient data are shown in Figure 17. The lowest level of confidence was in the accuracy of the outpatient data collection.

Figure 17 Site confidence in the overall accuracy of the patient data

Episode Type	Percentage of sites 'very confident' or 'confident' about the accuracy of the data
Overnight patients	93
Same day patients	100
Outpatients	80
Community clients	82

Figure 18 shows the results for each of the specific patient assessment tools used. In the case where a site did not use a specific tool, no response was required to this question. The highest level of confidence was with the accuracy of the Functional Impairment Code data, with all sites reporting that they were 'very confident' or 'confident'. However, one site suggested that additional codes were required for the coding of CVAs of the brain stem, for separate coding of upper limb orthopaedic conditions and for more detailed coding of fractured neck of femur. The RUG-ADL was also highly rated by sites. However, one site commented that the rating needed to be based on what the patient/client needed rather than on what the staff did for them and that this was sometimes confusing. Another commented that the RUG-ADL lacked sensitivity.

The lowest level of site confidence was with the MMSE. One site commented that further training was required whilst another felt that the MMSE was not an appropriate tool. Sites were consistent in their rating of the two palliative care tools (phase and severity). Sites confident with one tool were equally confident with the other. Sites were more confident about the FIM than the Barthel Index. However, this may be no more than a volume effect as only a minority of sites used the Barthel Index. Two sites commented that the FIM was not appropriate for use in an outpatient setting, one commented that it was not culturally appropriate for use with Aboriginal patients and another that FIM scores at episode start were more reliable than FIM scores collected at episode end.

Figure 18 Site confidence in the accuracy of the patient attribute data

Patient assessment tool	Percentage of sites 'very confident' or 'confident' about the accuracy of the data
RUG-ADL	96
Palliative Care Phase	89
Palliative Care Problem Severity Score	89
Mini Mental State Examination (MMSE)	87
RCI Behaviour Scale	89
FIM	96
Barthel	90
Functional Impairment Codes	100
HoNOS	91

Figure 19 shows site confidence in the staff time data collected. The highest level of confidence was

with the allied health data with all but one site being ‘very confident’ or ‘confident’. The lowest level of confidence was with the accuracy of the medical data with 68% of sites being ‘very confident’ or ‘confident’. Sites not confident about their medical data provided a variety of comments. In some cases, sites commented that the data from registrars and resident medical staff were accurate but that the data from medical specialists were not accurate. In other cases, the reverse held true. Some commented that the data were accurate for only some of the study. For example, one commented that two permanent medical staff were away for six weeks of the study and were only replaced intermittently. Six sites stated that some or all of their medical staff did not participate at all in the collection.

Figure 19 Site confidence in the accuracy of the staff time data

Staff group	Percentage of sites ‘very confident’ or ‘confident’ about the accuracy of the data
Nursing staff - ward based	93
Nursing staff - other	90
Allied health staff	99
Medical staff	68
Other staff	95

Figure 20 shows site confidence in the accuracy of the pathology, imaging, pharmacy and goods and services data. The number of sites that collected these data varied from 61% for pathology data to 35% for pharmacy data (see Sections 3.2 and 4.3).

Figure 20 Site confidence in the accuracy of the costing data

Staff group	Percentage of sites ‘very confident’ or ‘confident’ about the accuracy of the data
Pathology	78
Imaging	81
Pharmacy	63
Goods and services over $50.00	56

3.6.3 Other information collected in the site survey

The final component of the survey sought information on other characteristics of sites that could assist to describe the sample or to interpret the results. The survey asked each site to identify whether the period of the SNAP study had been a typical period for their service. The results are shown in Figure 21.

Figure 21 Nature of study period

Was the study period typical for your service?	Percentage of sites
yes	78
no	21
don't know	1

For sites reporting that the period was not typical, the two most common reasons were staff shortages for periods during the study or a higher than usual reliance on agency nursing staff. Other reasons given by sites included unusually high or low occupancy rates, peak period due to the winter season, absence of all admitting medical staff for two weeks and capital works in progress which disrupted ward activity. Two sites were under threat of closure during the study period and one participating ward was closed during the third month of the study.

Figure 22 shows the results of a question about whether the site was an accredited service. Of the hospitals participating in the study, 77% were accredited with the Australian Council on Healthcare Standards (ACHS). Of the participating community health services, 21% were accredited with the Australian Community Health Association CHASP Program. Some sites also indicated that they were accredited with other agencies.

Figure 22 Accreditation status of participating sites

Accreditation Agency	Percentage of sites accredited
Australian Council on Healthcare Standards	77
CHASP - Australian Council on Healthcare Standards	21

4. Preparatory analysis

4.1 Preparation of patient data prior to the allocation of costs

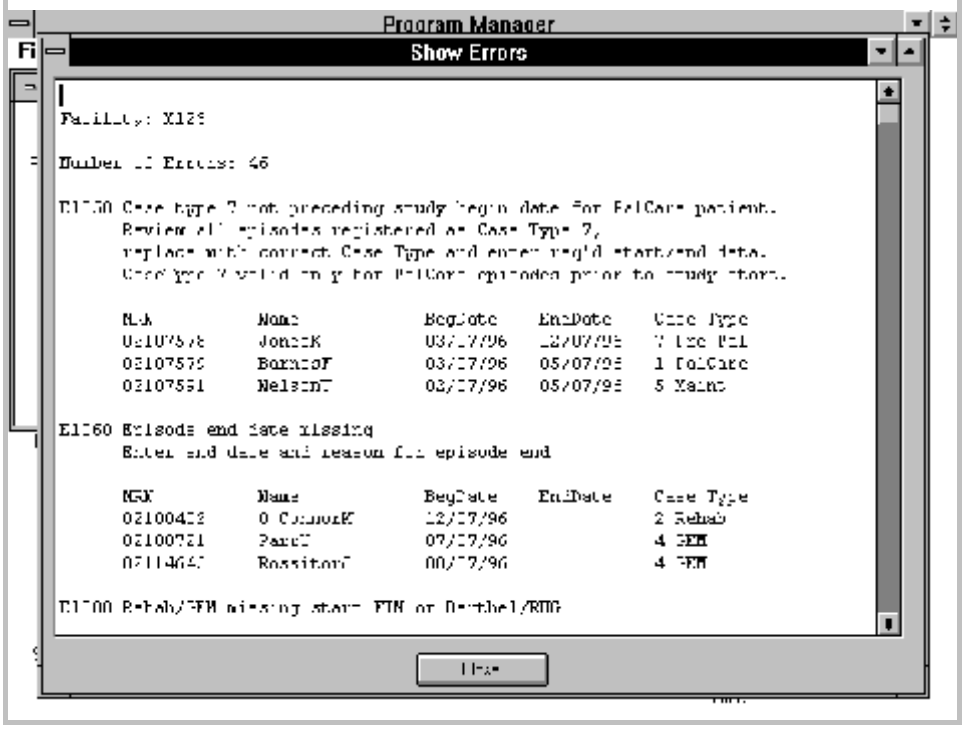
Systems were established for both line editing and output editing of the data prior to analysis.

A purpose-built software program called *SNAPEdit* was used by each site to edit their data. *SNAPEdit* performed the following functions:

- Identified errors in the data which had to be corrected;
- Applied query checks which highlighted possible anomalies in the data which may or may not have required correction;
- Checked the cost centre account codes recorded in the staff file to ensure that they matched the codes in the site's cost centre file (see Section 4.3.1);
- For sites which imported staff time data, *SNAPEdit* provided a facility to create a text file of errors which could be printed.

An example of *SNAPEdit* is shown in Figure 23.

Figure 23 Example of the SNAPEdit Error Program



Once data were received by the Study Team, *SNAPEdit* was re-run and additional data checks were made. The list of edits and queries is shown in Figure 24. Errors and queries were returned to sites for review and amendment in an iterative process over a period of three months. In a small number of cases, the required information was not available. In these cases, the missing data were excluded from analysis (see Section 5) and no attempt was made to estimate missing values.

Figure 24 Data Edits and Queries

Problem Type	Problem detail	Solution - study site	If, after review by site, problem not resolved, action taken by study team
Error	Patient registered in study but no clinical data entered.	Enter correct Case Type and enter required start/end data.	If no staff time, delete record. If staff time, reclassify to acute / primary care.
Error	Missing start data items	Record missing episode start data items	Episode costed, but item excluded from analysis
Error	Reason for episode end is change of Case Type and no new episode	Change Reason for Episode End	If all of study site in study, reclassify reason to discharge. If not, leave as is.
Error	Consecutive episodes with same Case Type and Episode Type	Nil	Combine to form one episode.
Error	End Reason not death and episode end data item missing	Record missing episode end data items	Episode costed, but item excluded from analysis
Error	End Reason is death but there is a subsequent episode of care	Change Reason for Episode End or delete subsequent episodes	Did not occur
Error	Episode with Case Type 1-5 with no matching staff time	Enter staff time data or delete episode	Episode deleted
Error	Episode Type is overnight but Episode Start/End dates are equal	Change episode type to 2, 3 or 4	Change episode type to 2, 3 or 4 depending on site
Query	Episode start date = project begin date	Check admit date to ensure that the correct episode start date is recorded	Nil
Query	Over 4 hours of staff time outside of episode dates	Staff time on days before episode start or after episode end. Check episode start and end dates for ALL episodes for patient	Time reviewed for each day of each episode. Episode start and end dates changed if necessary
Query	Staff time with no matching episode MRN	Confirm that MRN is for patient outside study scope	Classify episode as acute / primary care
Query	Overnight episode type and days without staff time is more than the number of leave days	Check dates of days on leave	Time reviewed for each day of each episode. Leave days amended if necessary
Query	Other patient/s seen on more than one occasion for assessment only.	Clinical review.	Nil
Query	Patient/s not fluent in English (MMSE item) but with no need for interpreter.	Check interpreter requirement	Nil
Query	RUG-ADL mobility score = 5 and other RUG-ADL score is less than 5	Patient/s unable to move in bed are usually unable to toilet, transfer or eat without extensive assistance. Check RUG scores	Nil

Problem Type	Problem detail	Solution - study site	If, after review by site, problem not resolved, action taken by study team
Query	Episode start date before 01/01/1996	Check that episode start date is correct.	Nil
Query	Bereavement phase end/death with no record of Bereavement Phase.	Confirm bereavement support not provided	Nil
Query	PalCare patient/s transferred from palliative care to acute care	Clinical review.	Nil
Query	PalCare patient transferred to other care with severe problems.	Clinical review.	Nil
Query	PalCare PC Phase not bereavement and PCProb is 0	Patients in palliative care usually have problems. Confirm patient has no problems.	Nil
Query	Age < 60 years classified as Psychogeriatric or GEM.	Confirm that date of birth is correct	Nil
Query	Psych phase of consolidation with LOS < 10 days and End Reason not death or transfer	Patients in consolidation phase are not usually discharged for this reason. Check phase.	Nil
Query	Psych phase of acute and has a length of stay greater than 45 days	Patients with this length of stay are usually classified to the consolidation phase. Check phase.	Nil
Query	Rehab FIM/Barthel score drop of 20% - End Reason not 5,6,7,D or E	Patient/s function has declined during rehabilitation episode. Clinical review.	Nil
Query	Rehab/GEM episode with impairment code of 13	Confirm that patient should not have a more specific impairment code	Nil
Query	GEM Behaviour score on any item = D, indicative of significant problems	Confirm that patient does not meet criteria for Psychogeriatric Case Type	Nil

The final check made by the study team prior to the allocation of costs was to review all episodes with apparently extreme staff time values. This included:

- overnight episodes with less than 120 minutes or more than 960 average minutes of staff time per day;
- same day episodes with less than 60 minutes or more than 480 average minutes of staff time per day;
- outpatient and community episodes with less than 15 minutes or more than 480 minutes of staff time per day.

This check involved a review of staff time for each day of each episode. Obvious errors were corrected. In over 90% of cases, this involved a correction of start and episode end dates. For example, an episode with an end date of 28/07/96 but with staff time recorded on a daily basis ending on 28/08/96 was reviewed. An episode with an end date of 28/08/96 but with no staff time recorded after 28/07/96 was likewise reviewed.

Some episodes were reviewed where the pattern of staff time was consistent with the average value recorded. In these cases, the episode was not amended. In a small number of cases, it was necessary to seek further information from the site. These contacts confirmed that the average value recorded was correct. In these cases, the episode was not amended.

4.2 The Edited Episode Data Set

Figure 25 shows the episode data set at the completion of the clinical data editing process. In addition to the 30,604 episodes that were in scope for the study, the data base also included a total of 7,612 acute and primary care episodes. In total, the 104 study sites in the SNAP study had collected both a clinical data set and a costing data set on 38,216 episodes of care. The acute and primary care episodes by Episode Type are shown in Figure 26. A breakdown of Case Type and Episode Type by de-identified study site is included as Appendix 7.

Figure 25 The Edited SNAP Episode Data Set

		EPISODE TYPE				
		Overnight patient	Same day patient	Outpatient	Community client	**TOTAL**
CASE TYPE	Palliative care	1,868	54	148	2,526	**4,596**
	Rehabilitation	7,397	603	1,704	741	**10,445**
	Psychogeriatric	479	13	102	363	**957**
	Geriatric evaluation and management	1,882	262	655	2,437	**5,236**
	Maintenance care	1,565	58	851	6,896	**9,370**
	TOTAL	**13,191**	**990**	**3,460**	**12,963**	**30,604**

Figure 26 The Edited Acute and Primary Care Episode Data Set

	EPISODE TYPE				
	Overnight patient	Same day patient	Outpatient	Community client	**TOTAL**
Primary and Acute Care	1,431	147	776	5,258	**7,612**

Each of these 38,216 episodes was then costed using the costing process described in the next section.

4.3 The Costing Process

The design of the financial data collection undertaken by study sites was described in Section 3. This section describes the preparatory analysis of the financial data and the assignment of costs for each patient episode.

4.3.1 SNAPCost

A purpose-built software program known as *SNAPCost* was designed and was distributed to all study sites. It performed the following major functions:

- Checked each cost spread sheet file for errors;
- Generated for each site a list of cost centre (or account) codes to check against the SNAP staff file;
- Allocated the costs from overhead cost centres to direct (final) cost centres;
- Produced a summary showing the final costs by patient care cost centre to enable finance staff to check that correct cost data were being supplied to the SNAP project team;
- Created a file for input to the SNAP analysis database.

The overall process and the link to the *SNAPEdit* program is shown in Figure 27. The names for the various files were predefined. Since multiple facilities were involved, file names were prefixed with the four character facility code. For example, the 'cost' file prepared by the finance staff was named XXXXCC.CSV. In Figure 27 the facility code 'X126' has been used so this file is named X126CC.CSV.

Figure 28 shows the format of the financial data (the CC file) prepared for each study site. Each cost centre (CC) code was required to be specified as one of the following types:

- Ohd: Overhead
- SW: Salaries & Wages
- GS: Goods & Services
- Cap: Capital
- Pharm: Pharmacy
- MedSurg: Medical/Surgical Supplies
- NonSnap: Non-Study Costs
- Oth: Other Costs

The StatNum column refers to the overhead allocation statistic to be used to allocate overhead costs to direct care cost centres. The overhead allocation statistics used are included as Appendix 9.

Figure 27 Files used in the Costing Process

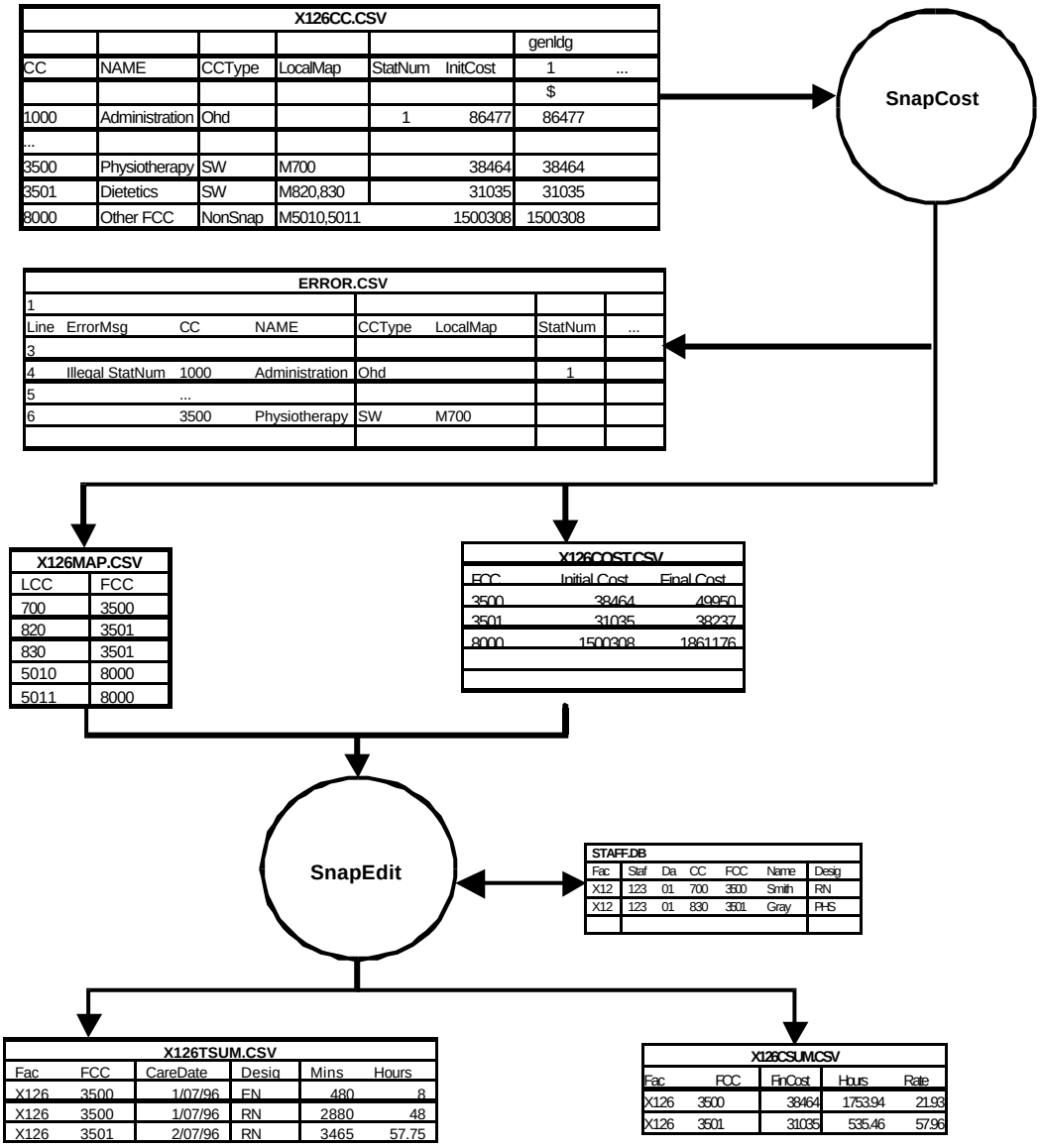


Figure 28 Format of the financial data prepared for each site (the CC file)

										genldg	dirlab	nrsfte	pats	flrspc
CC	NAME	CCType	LocalMap	StatNum	M1	M2	M3	InitCost	Adjust	1	2	3	4	5
										$	$	No.	No.	sqmtr
1000	Administration	Ohd		1				86477		86477	67354	0	0	1020
1001	Payroll Service	Ohd		2				57039		57039	43546	0	0	1041
1002	Nursing Admin	Ohd		3				39485		39485	18364	0	0	1062
1010	Medical Records	Ohd		4				27485		27485	21037	0	0	1083
1500	Laundry	Ohd		4				48577		48577	36475	0	0	1104
1505	Cleaning	Ohd		5				50643		50643	40884	0	0	1125
1506	Maintenance	Ohd		5				55037		55037	15500	0	0	1146
1507	Electricity	Ohd		5				42036		42036	20374	4	0	1167
1509	Security	Ohd		5				17273		17273	13283	0	0	1188
1600	Supplies	Ohd		1				31993		31993	16475	0	0	1209
1601	Printing	Ohd		4				24153		24153	19000	0	0	1230
3000	Microbiology	GS						100263		100263	80490	2	775	885
3001	Radiology	GS						106648		106648	83645	3	465	900
3002	Pharmacy	GS						93772		93772	35001	1	475	1102
3003	Nuclear Medicine	GS						55555		55555	47464	1	374	740
3500	Physiotherapy	SW	M700					38464		38464	30475	0	275	351
3501	Dietetics	SW	M820,830					31035		31035	18003	1	174	157
8000	Other FCC	Non Snap	M5010,5011					1500308		1500308	1030216	423	5233	9744

This CC file was run through *SNAPCost*. If *SNAPCost* detected any errors in the CC file it created a file called ERROR.CSV which contained all of the cells of the original spreadsheet but prefixed with two extra columns - Line Number and Error Message. Rows with errors contained a message in the Error Message column. All errors had to be fixed before *SNAPCost* would proceed to the next step.

If *SNAPCost* did not detect any errors it performed the allocation process of overhead costs to direct care (final) cost centres. It then produced an on-screen summary of the process as a table of FCC (Final Cost Centre), Initial Cost, Final Cost (Initial Cost plus share of overheads) and percentage increase in costs. An example of this summary is shown in Figure 30. *SNAPCost* also produced a file which mapped account codes from the LocalMap column for SW (Salaries & Wages) cost centres to FCC (Final Cost Centre) codes.

The *SNAPCost* process was undertaken for some sites by the study team. Other sites undertook this process locally. In these cases, the process was repeated by the study team for validation purposes.

The completed cost files for each site were then fed into *SNAPEdit* to ensure that all staff cost centre codes in *SNAPware* matched those in *SNAPCost* and to calculate hourly rates by discipline (see Figure 29). When this process was complete, the final costs were used to allocate costs to each individual day of care for each patient. This process is described in the next section.

Figure 29 Example of *SNAPEdit* checks of cost centres

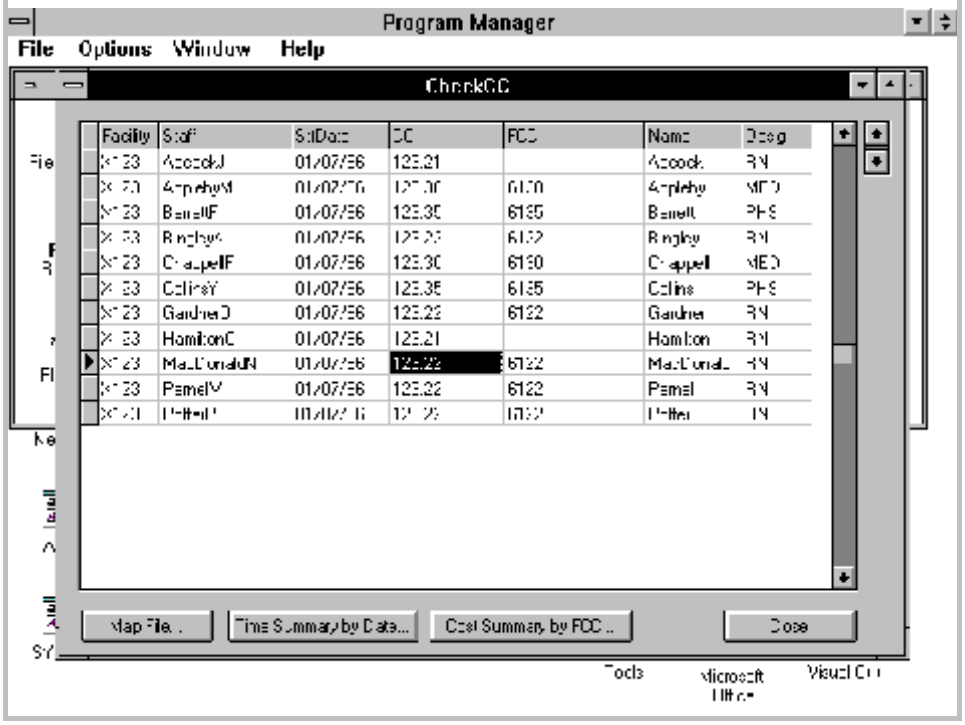
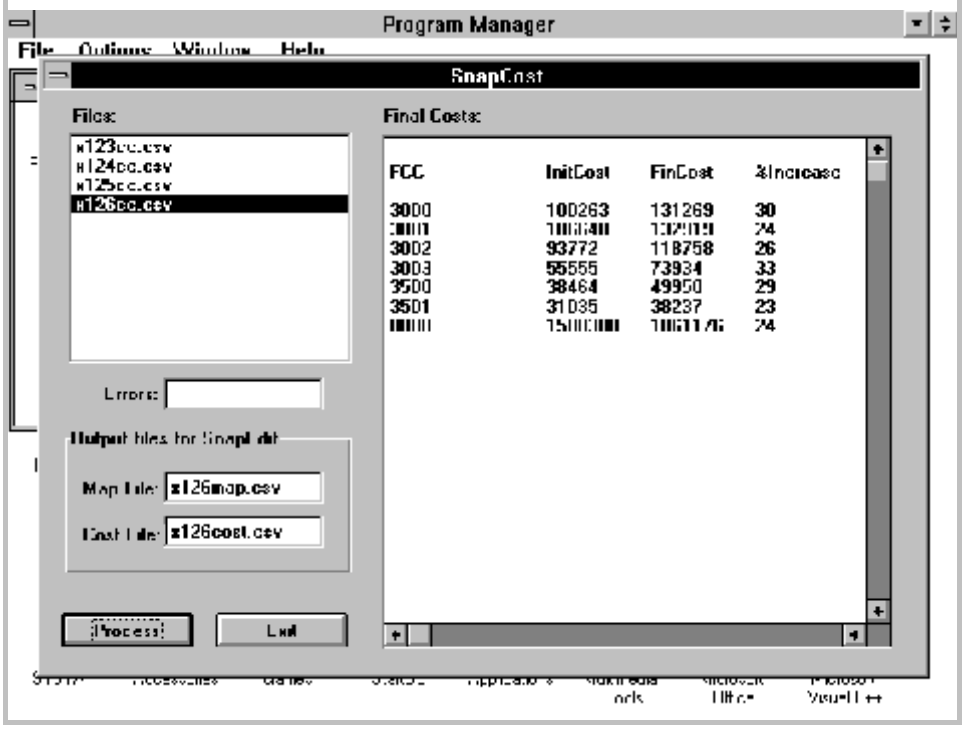


Figure 30 Example of a *SNAPCost* report



4.3.2 Allocation of staff time to each episode

The next step in the preparatory analysis was the allocation of staff time to each patient. This process was undertaken by a purpose-built program called *SNAPEdit2* and began by grouping recorded staff time into one of four types:

1 Patient attributable time

All time spent in **direct hands on care**, including assessment, treatment and escort, and **indirect time** such as phone calls relating to the patient, communicating with relatives and carers, case conferences, liaison with other health professionals about the patient/client, organising interpreters, writing patient records, inspecting homes, arranging patient discharge, staff supervision in relation to a specific patient/client, developing a case plan etc. It includes **direct group** care provided to patients treated in groups where the individual patients can be identified (eg therapy groups for registered patients/clients). Patient attributable time excludes travel time.

All patient attributable time was allocated on a daily basis to each patient.

2 Other activities - teaching and learning, research, health promotion

All time associated with teaching, research, health promotion and community development, including preparation and travel time. This time was identified on a daily basis for each cost centre and was separately costed.

3 General clinical time and clinical travel time

All time spent on clinical activities that cannot be attributed to any one patient/client. This includes ward rounds, team allocation meetings, intake, handover, patient clinical team meetings and all on-duty time spent travelling to see one or more patients/clients.

All general clinical time (including clinical travel time) was allocated as overhead time across all patients. None of this time was allocated as an overhead to other activities.

4 General time - other travel, quality improvement and administration

All on-duty time spent travelling for any other purpose (eg to pick up stores or attend a meeting), on all quality improvement activities including quality assurance and staff development, administration and all other time on duty.

This time was allocated as overhead time to both patients and to all other activities.

The unit of distribution was all the time reported in each cost centre on each day of the study. A critical issue for non-overnight patients was the unit of counting to be used for the allocation of overhead time. Two options were considered - the '*day*' or the '*provider contact day*'. On clinical advice, the unit of counting used was the '*provider contact day*'. A *'provider contact day'* is a day on which any one staff member records time with any one patient.

Eg 1 Two workers visit the same patient on the one day (either together or separately). If the unit of counting is the '*provider contact day*' then this is counted as 2 units. If the '*day*' is the unit of counting, then this is counted as 1 unit.

Eg 2 Five allied health professionals see the same patient on the one day in the day hospital. If the unit of counting is the '*provider contact day*' then this is counted as 5 units. If the unit of counting is the '*day'*, then this is counted as 1 unit.

This algorithm is shown diagrammatically in Figure 31. The actual algorithm used for the allocation of staff time was as follows:

1 Take all staff allocated to each cost centre each day

2 Calculate:
- 2.1 total patient attributable time reported for overnight patients and the total patient attributable time reported for all ambulatory patients
- 2.2 total patient attributable time per patient
- 2.3 the total number of staff recording time each day for each ambulatory patient. This is the total '*provider contact day*'
- 2.4 total time per cost centre for each other time category (general clinical time, teaching etc)

3 Take overhead clinical time (the sum of General Clinical Time and Clinical Travel Time) for each final cost centre and allocate a share of the total between total SNAP and total non-SNAP patients in proportion to patient attributable staff time reported by that cost centre.

4 Take overhead non-clinical time (the sum of other travel, quality management, administration, other time and unreported time) and allocate in proportion to time reported for:
- SNAP patients total;
- Non-SNAP patients - this is a final product;
- Teaching - this is a final product;
- Research - this is a final product;
- Health Promotion - this is a final product.

5 Take the SNAP patients' share of overhead time from Step 4 and allocate a share:
- 5.1 between overnight and ambulatory patients in proportion to patient attributable time recorded;
- 5.2 then take the time allocated to overnight patients and allocate an equal share to each overnight patient;
- 5.3 then take the time allocated to ambulatory patients and allocate a share to each patient in proportion to the number of total provider contact days.

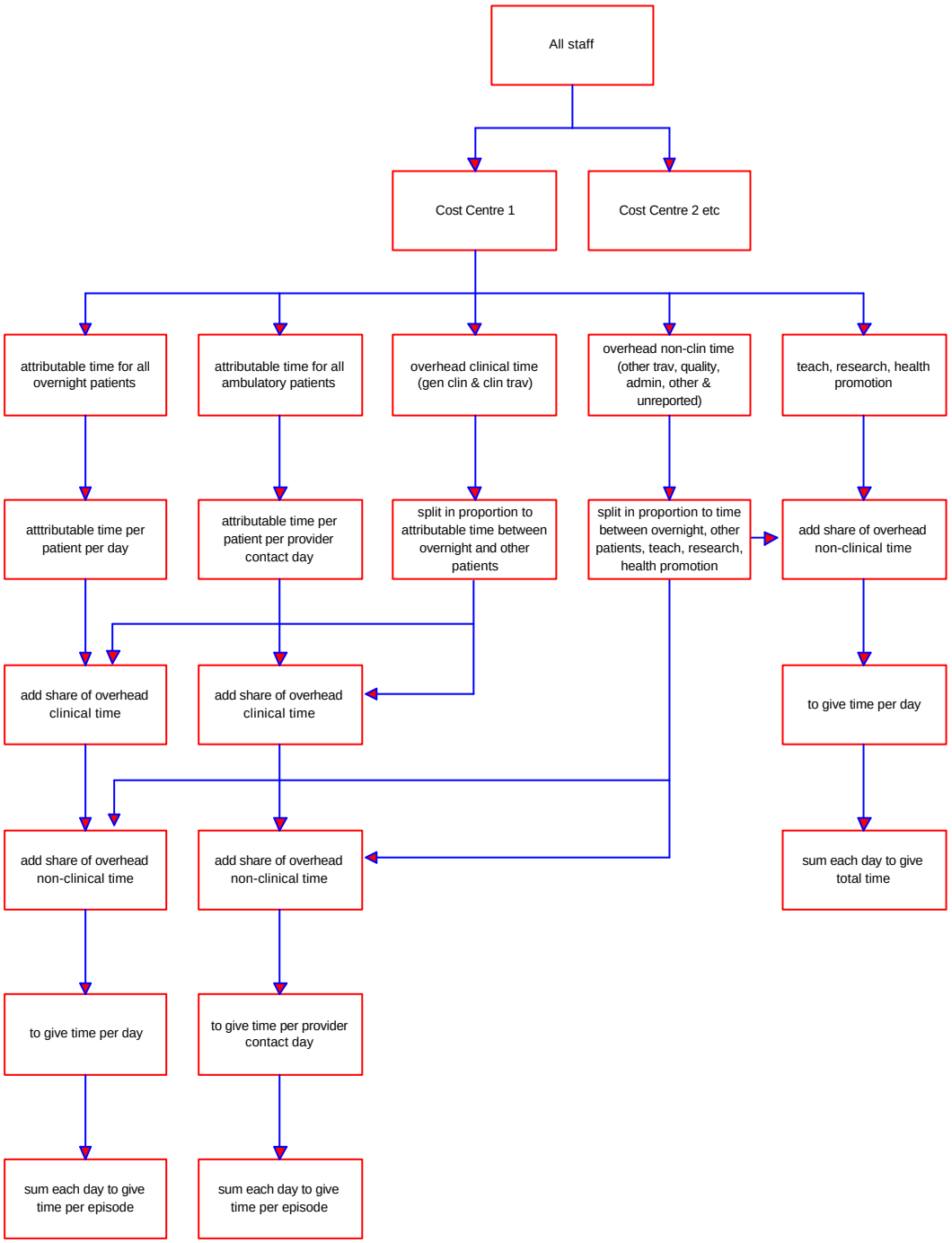
6 Take the patient attributable time recorded for each patient and add the share of overhead time from Step 5 to give the total minutes of time for each patient day.

7 Take total time per patient per day and sum to give patient time per episode per cost centre.

8 Take all cost centres and sum to give total patient time per day and per episode.

The resultant time for each patient for each day and for each episode was then costed against each cost centre (see Section 5.5).

Figure 31 Algorithm Used for the Allocation of Staff Time



4.3.3 Separation of Costs into Core and Other costs

The next step was to split the costs of the study sites into Core Costs and Other Costs. Core costs only were used to develop the casemix classes. Other costs were then added back in to derive a final cost for each class. The reason for this is explained below.

Final Cost Centre (FCC) costs that were excluded from the Core Costs were:

- Medical costs;
- Imaging;
- Pathology;
- Pharmacy;
- Volunteer time;
- Capital costs.

Services included in the Core Cost file are shown in Figure 32. This core cost file contained the total final cost, including a share of overhead costs, for six of the twelve classes of service cost.

Figure 32 Core Costs used for Class Finding

Service	Inclusions
Nursing	Clinical Nurse Consultant, Clinical Nurse Specialist, Enrolled Nurse, Registered Nurse
Physical therapies	Physiotherapist, Occupational Therapy, Speech Therapy, Therapy Aid
Psychosocial services	Social Worker, Psychologist, Aboriginal Health Worker, Chaplain
Other allied	Audiologist, Dietitian, Interpreter, Podiatrist, Recreation Officer, Hydrotherapist, Care Aid, Other
Medical & surgical supplies	Equipment, prostheses, patient transport, external health services
Goods and services	

The rationale for excluding certain costs from the files used for class finding is shown in Figure 33. Services provided by volunteers and students, whilst not representing a financial cost to the participating site, were also included in this group.

Figure 33 Services excluded from the Core Cost File

Service	Reason for exclusion from core cost
Medical	1 Private sector costs not met by hospital 2 Costs of private and compensable patients in public sector not met by hospital 3 Material differences in input costs between States for public sector sites 4 Shared care in community may confound data
Imaging	1 Private sector costs not met by hospital 2 Community client costs not uniformly met by public sector sites
Pathology	as per imaging
Pharmacy	as per imaging
Capital (land, building and equipment greater than $50K)	1 Public sector costs not met by hospital in most States 2 Costs not uniformly met by hospital in private sector
Volunteer time	Availability of volunteers services differs between services and do not represent a financial cost to the service. Note however that the costs of supporting and training volunteers were included in the Core Costs.

After the casemix classes were developed using the core costs only, the average cost per class was calculated for each “Other Cost” and these were then added back into each class. The allocation methods are shown in Figure 34.

Figure 34 Allocation Method for Other Costs

Cost	Allocation method
Medical costs	Reported doctor time in minutes by casemix class
Volunteer time	Reported volunteer time by casemix class
Imaging	Cost by casemix class based on frequency and type of test reported at those sites with detailed and accurate information systems
Pathology	as per imaging
Pharmacy	as per imaging

Capital (land, building and equipment greater than $50K)	Allocated to classes on a per diem basis using the method described in Appendix 14

4.3.4 Mapping of Australian and New Zealand Costs

Two versions of the cost files for New Zealand sites were prepared. The first was prepared in New Zealand dollars using the costs provided by each site. The second was prepared by converting the New Zealand dollar costs to Australian dollars.

The conversion rates used were those provided by the Reserve Bank of Australia Bulletin, January 1997 for the three months of the study. An average exchange rate of 1.1325 was used to convert all costs to Australian dollars. The Australian dollar versions of the cost files were then used in the final analysis.

4.3.5 Files Available for Analysis

The outcome of the costing process was the creation of five new files for each site which could be used both for input into the central SNAP database and for analysis purposes:

The New Episode File

A New Episode file (named NewEpi) was created which provided a summary of the clinical attributes and cost of each episode. It included:

- all of the episode and clinical details collected on each episode during the study but re-coded to numeric non-null values;
- a set of derived episode and clinical fields such as age, length of stay and total scores for the FIM, Barthel Index, RUG-ADL, HoNOS and RCI Behaviour scale;
- a set of derived costing fields including the core cost, final cost, average cost and costs for each of the 12 cost buckets to be reported for each class (see Section 4.3.3 and Appendix 14); and
- a derived field called Straddle which classified each episode as either complete, ongoing, ending or starting (see Section 4.4.1).

The New Phase File

A New Phase file (named NewPhs) was created which provided a summary of the clinical attributes and cost of each palliative care phase. It included:

- all of the phase and clinical details collected on each phase during the study but re-coded to numeric non-null values;
- a set of derived phase and clinical fields such as length of phase and the total score for the RUG-ADL;
- two derived costing fields - the core cost and the average cost of each phase (see Section

4.3.3 and Appendix 14); and

- a derived field called Straddle which classified each phase as either complete, ongoing, ending or starting (see Section 4.4.1).

The Final Cost Centre Totals File

This file (named FccTot) contained summary data by day for each Final Cost Centre. It contained a breakdown of staff time for Teaching, Research and Health Promotion which was excluded from the other analysis files. It also contained the initial rate of staff time per minute for each cost centre (recorded in dollars and cents) and the final rate of staff time after the distribution of overhead costs (again recorded in dollars and cents).

The Final Cost Centre Totals 2 File

This file (named FccTot2) had the same fields as FccTot but contained only totals for acute and primary care episodes and for other out of scope (nonsnap) patient services.

The Day Resources File

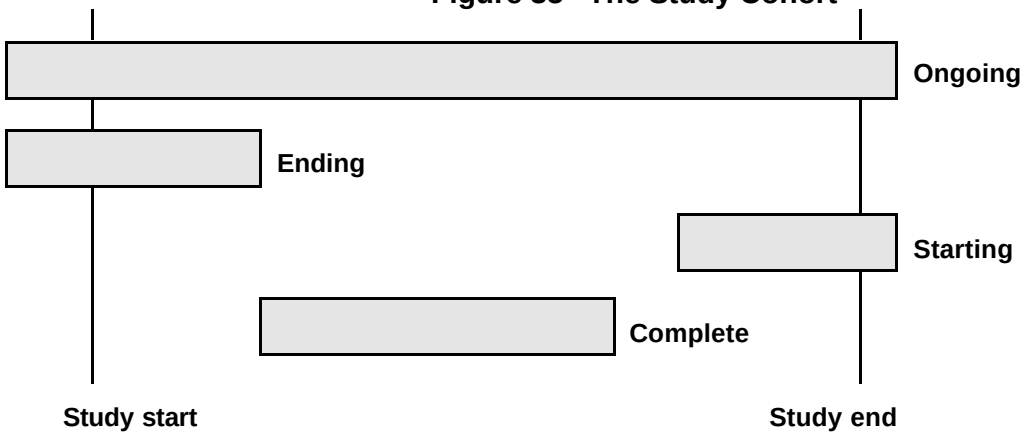
This file (named DayRes) contained the actual core costs by day for each episode. A day number was assigned to each care date with the begin date being classified as day one. Any costs incurred before the episode begin date were assigned a negative number. For example, the costs of a pre-admission assessment that occurred seven days before admission would be recorded as occurring on Day -7. Likewise, any costs incurred after the episode end date were also recorded in the DayRes file.

4.4 Preparation and trimming of the costed data prior to analysis

4.4.1 Episodes that straddle the start and end points of the study

As shown in Figure 35, the study cohort contains four subsets:

Figure 35 The Study Cohort



The Ongoing Cohort
Those in receipt of care prior to study start and still in receipt of care at study end.

The Ending Cohort
Those in receipt of care prior to study start but complete care before study end. The SNAP data set includes information on the end of their care period, but not on the period prior to the study.

The Starting Cohort
Those who begin care after study start and still in receipt of care at study end. The SNAP data set includes information in the first part of their episode, but not on the full episode of care.

The Complete Cohort
Those who complete an episode between study start and study end.

The split of episodes by type is shown in Figure 36.

Figure 36 Episodes that Straddle the Start and End Points of the Study

	EPISODE TYPE				
	Overnight	Same day	Outpatient	Community	**TOTAL**
Ongoing	332	48	298	2,809	**3,487**
Ending	2,316	187	351	2,627	**5,481**
Starting	2,093	156	790	2,477	**5,516**
Complete	8,449	598	2,018	5,048	**16,113**
Before or after	1	1	3	2	**7**
TOTAL	**13,191**	**990**	**3,460**	**12,963**	**30,604**

The following rules were used to prepare the records for analysis:

Ongoing The episode of care was defined as the package of care received over a period of three months. At the end of the three month period, the current episode ends and a new one begins. The ongoing subset was thus included in both the per diem and the per episode analysis.

Complete This subset was included for both per diem and for per episode analysis.

Ending Critical admission data were not available for the majority of this subset except for episodes from a small number of sites who provided clinical data recorded at the start of the episode rather than at the start of the study period (eg, functional score at admission). Episode start and end dates (and therefore length of stay for overnight patients) were available.

Non-overnight episodes were costed and included in the data set used for per diem analysis. For this analysis, clinical data items at study start and episode end were used. However, they were excluded from the data set used for the episode analysis because information on the number of days of care prior to study start was not available.

All overnight episodes were included in the per diem analysis again using clinical data items at study start and episode end. In addition, 73 overnight episodes were included in the per episode analysis. Episodes were included if they met the following criteria:

- the site was a brain or spinal cord rehabilitation unit or a psychogeriatric unit;
- the episode began in the seven days immediately prior to the study start and all admission data items were recorded;
- or, in the case of units that provided episode start data based on an assessment undertaken at episode start rather than at study start, less than 25% of the episode occurred before the first date of service utilisation data collection.

In these cases, daily costs for the extra days were imputed using the average daily cost for the first seven days after study start. If the length of stay was shorter than seven days, the average daily cost for the episode was used.

Starting Two data elements were missing for this cohort - discharge data items and length of episode. Like the ending subset, this subset was included in the per diem analysis. 113 overnight episodes that straddled the end of the study period were included in the per episode analysis. These episodes met the following criteria:

- the site was a brain or spinal cord rehabilitation unit or a psychogeriatric unit; and
- discharge occurred within the last month of the study, the reason for episode end was not “still in care at study end” and discharge data items were recorded; and
- less than 25% of the episode occurred after the last date of service utilisation data collection.

In these cases, daily costs for the extra days were imputed using the average daily

cost for the seven days immediately proceeding the extra days. If the length of stay was shorter than seven days, the average daily cost for the episode was used.

4.4.2 Trimming of outliers prior to analysis

A review of all episodes with an average cost of more than $600 per day was undertaken prior to the analysis of the full data set. An equivalent review of palliative care phases with a length of stay of more than one day and a daily average cost of more than $600 per day was also undertaken. In both cases, the reviewed cost per day was the core cost only - imaging, pathology, pharmacy, capital, medical and volunteer time were excluded (see Section 4.3.3).

A total of 351 episodes and 83 palliative care phases were reviewed. As a result of this process, 43 episodes were regarded as outlier episodes and were excluded from the final analysis data set. Of these outlier episodes, 36 episodes were excluded because more than 90% of the episode cost consisted of the cost of equipment or prosthesis. 8 phases were excluded on the same basis.

The costs of the remaining 308 episodes and 75 phases were found to be correct. They were therefore included in the analysis data set.

A review of extremely low cost episodes was also undertaken. These were defined as overnight episodes with an average daily core cost of less than $50.00 or other episodes (same day, outpatient and community) with an average daily cost of less than $5.00.

A total of 202 overnight episodes and 370 other episodes were identified that met these criteria. They included the seven episodes identified in Section 4.4.1 that occurred before or after the study period. All of these episodes occurred within a few days of the study period. These episodes were regarded as errors and were excluded from the data set.

Four sites accounted for over half of the overnight episodes reviewed. Half of the low cost overnight episodes were classified as ‘assessment only’ episodes and had a length of stay of one day. These episodes had been incorrectly classified as overnight episodes. They were reclassified to outpatient episodes.

After review, 122 overnight episodes were regarded as outlier episodes and were excluded from the analysis data set. These low cost outliers were of the following Case Types:

- Palliative Care 9
- Rehabilitation 31
- Psychogeriatric 4
- GEM 58
- Maintenance 20

Two patterns were evident in the 370 other episodes reviewed. Some were episodes where the patient had already had an overnight episode. A new episode had been registered into the study as either a same day, outpatient or community episode and the reason for episode start had been recorded as “transfer from overnight patient”. However, no staff time had been recorded indicating that the expected episode did not eventuate.

The majority of the remaining episodes involved patients seen for a one-off assessment by only one health professional. These episodes could have consisted of no more than a brief telephone contact.

All of the 370 non-overnight episodes with a cost of less than $5.00 were regarded as outlier episodes and excluded from the analysis data set. These low cost outliers were of the following Case Types:

- Palliative Care 46

C	Rehabilitation	40
C	Psychogeriatric	9
C	GEM	167
C	Maintenance	108

In addition to these high cost and low cost outliers, 12 paediatric episodes were excluded so that their costs could be separately analysed.

4.5 Mapping of the FIM and Barthel Index data

In the absence of a standard national measure of function, SNAP study sites were given the option of measuring functional capacity for rehabilitation and GEM patients by use of either the Barthel Index or the Functional Independence Measure (FIM). Sites electing to use the Barthel Index were also required to capture function by use of the RUG-ADL. The FIM was the preferred tool for the study and sites not already using the FIM were offered accredited FIM training if they elected to use it (see Section 3). In the event, 75.4% of all episodes had a FIM score and 24.6% had one of the various versions of the Barthel Index or the Modified Barthel Index.

The use of two measures of function in the one study is far from ideal. However, it was important that the SNAP study sample across all relevant sites in Australia irrespective of staff preference for one or other of these scoring systems. It was anticipated that a mapping algorithm would be developed allowing data from all sites to be compared. In the event that the FIM and Barthel data could not be directly mapped, a mapping would be undertaken by use of the RUG-ADL. This section reports on an investigation to determine the feasibility of mapping directly between the FIM and the Barthel.

Data were provided to the study team from five sites which have experience with both scoring systems. These data included results for a large group of patients who were assessed independently with each method. These sites were located in metropolitan Sydney north (3 sites - 2 public and 1 private), metropolitan Melbourne and Sydney south (admissions only). The last two sites could only provide a total FIM while the data from the first three sites were able to be broken up into the FIM components. Clinical advice suggested that the FIM Motor Score is a closer congener of the Barthel than is the total FIM. Consequently, FIM Motor was requested from each of these sites.

Figure 37 shows correlations between Barthel and the relevant FIM. The rank correlation coefficient (Spearman) is a rank correlation coefficient which is less powerful than the standard coefficient (Pearson) but not as dependent on assumptions about the underlying distribution of the scores.

Figure 37 Correlations between Barthel and FIM

	Sites 1, 2 and 3 (Sydney north)	Site 4 (Melbourne)	Site 5 (Sydney south)
No. Valid Records	553	872	497
Mean Barthel Admission	58.2	57.5	62.0
Mean FIM Admission	56.8[1]	82.3	89.0
Correlation	0.865	0.788	0.798
Rank correlation	0.864	0.795	0.794
Mean Barthel Discharge	83.6	80.5	n/a
Mean FIM Discharge	73.8	101.5	n/a

[1] FIM Motor only

Correlation	0.958	0.882	n/a
Rank Correlation	0.935	0.813	n/a

The data support the clinical advice in that the Sydney north sites, where FIM motor is scored, achieve higher correlation coefficients than the sites using the total FIM score. The correlation at discharge is higher than that at admission in both Sydney north and Melbourne but it will be observed that while the product moment and rank correlations are almost identical for admissions, the rank coefficients are lower for discharges. This arises because of the large number of patients who score very highly at discharge when the effect of treatment has been reflected in the score. The admission scores have substantially lower means and, when plotted, they appear to be normally distributed.

It was decided that the correlation between the scoring systems was sufficiently close to attempt to map the Barthel sites into a FIM equivalent. The preferred study was derived from 511 of the 553 patients (92%) at the Sydney north sites using Barthel and FIM motor scores at the time of admission. The unused 42 cases were trimmed from the main data set and regarded as outlier values.

Figure 38 indicates the mean and standard deviation in terms of FIM motor scores for each Barthel reading at the time of admission. There is an average reduction of FIM motor score of about 3 units for every 5 unit reduction in Barthel. The mean values appear to be of reasonable consistency but would be improved by minor smoothing. The standard deviation is between 1 and 2 times the difference in Barthel score.

Figure 38 Mapping of FIM and Barthel Index

Sample No.	Barthel Value	FIM Motor Value			
	Mean	Mean	Min	Max	St Dev
7	100	84.7	82	90	4.2
15	95	82.0	74	89	4.6
14	90	77.9	73	83	4.0
26	85	73.4	58	82	5.9
24	80	70.1	62	80	5.8
26	75	69.9	55	82	6.0
32	70	66.9	56	77	6.0
64	65	64.3	50	79	6.4
65	60	58.2	46	69	6.1
57	55	54.3	37	67	7.0
63	50	51.3	34	64	6.9
38	45	47.0	34	57	5.8
22	40	43.3	30	52	6.1
21	35	39.7	23	50	6.3
14	30	34.6	25	44	5.9
9	25	35.4	31	41	3.8
4	20	31.0	26	35	3.7
3	15	27.0	23	33	5.3
3	10	25.7	24	38	2.1
4	5	20.8	13	27	6.4
511	**ALL**	**56.8**	**13**	**90**	**14.9**

Three possible approaches to mapping were considered. These were:

(1) To create a new categorical variable for both Barthel and FIM based on an ordinal value such as 'Low', 'Moderate' and 'High'.

(2) To employ a deterministic approach and map each Barthel value to a single FIM motor value.

(3) To employ a stochastic approach and randomly generate a FIM motor value from the known mean and standard deviation of the Barthel value.

There are advantages and disadvantages with each of these methods.

A new categorical variable avoids an attempt at direct mapping but prevents the classification grouper from choosing the most appropriate point for designation of 'high', 'medium' and 'low'.
In total, 379 cases are placed in the same third and 132 in a different third. Barthel scores of 50 to 55 and 65 to 70 are on the cusps so that placement within the categorical variable still contains an arbitrary element.

The deterministic model will place each Barthel into a single FIM score producing a rather lumpy distribution although as Barthel maps comprise only 25% of the final distribution, the mapping points may not be markedly noticeable. This approach ignores all other mapping points apart from the mean.

The stochastic approach has the merit of finding a range of FIM values for each Barthel. However, the distributions at each Barthel score lie somewhere between uniform and normal so that the choice of random number generation is unclear. A second disadvantage is that the randomly generated FIM score has the potential to distort the other factors used by the grouper.

It was decided that a Barthel to FIM motor mapping algorithm be adopted using deterministic mapping points corresponding to a smooth progression of mean values. The values used are shown below as Figure 39.

Figure 39 Mapping values as used in the analysis

Barthel	FIM Motor
100	85
95	82
90	78
85	73
80	71
75	69
70	67
65	64
60	59
55	54
50	51
45	47
40	43
35	40
30	35
25	33
20	31
15	27
10	25
5	21

This approach allowed Barthel scores to be mapped to FIM Motor scores. However, the Barthel Index contains no items that are equivalent to the FIM Cognition items. In consequence, data from Barthel sites would need to be excluded from the any analyses involving the FIM Cognition items.

4.6 The final data set

Figure 25 in Section 4.2 showed the episode data set at the completion of the clinical data editing process. This included a total of 30,604 in-scope episodes.

The total number of episodes used in the final analysis was then reduced as a result of trimming of outliers prior to analysis (see Section 4.4.3) which reduced the data set by 547 episodes (1.79%).

At the completion of this editing process, the final data set available for analysis was 30,057 or 98.21% of the initial data set. The final data set by Case Type and Episode Type is shown in Figure 40.

Figure 40 The Final SNAP Episode Data Set

		EPISODE TYPE				
		Overnight patient	Same day patient	Outpatient	Community client	**TOTAL**
CASE TYPE	Palliative care	1,849	58	143	2,480	**4,530**
	Rehabilitation	7,305	599	1721	737	**10,362**
	Psychogeriatric	473	13	98	360	**944**
	Geriatric evaluation and management	1,818	261	625	2,299	**5,003**
	Maintenance care	1533	65	794	6834	**9226**
	TOTAL	**12,975**	**992**	**3,381**	**12,719**	**30,057**

5. Analysis

5.1 Statistical methods

There were two main stages in the analysis of the final data set. The first stage involved a thorough investigation of the variables to ensure that there were no errors or inconsistencies. Only when this careful checking was completed did the second stage of modelling the data begin.

An exploratory data analysis was undertaken during this first stage. This involved examining variables of interest one at a time. Means, standard deviations, medians, ranges, correlations and other descriptive statistics were calculated. Stem and leaf plots, box plots and histograms were drawn where relevant. Bivariate plots were drawn where interest centred on the relationship between two variables. Comparative box plots were constructed for several of the variables, such as cost, age and function scores, in order to investigate the differences between facilities, between Episode Types and between Case Types. From these box plots, as well as from frequency tables for each site, it was possible to look for anomalies in the mix of patients at each facility, and to ensure that there had been consistency in the interpretation of the variables. For instance, a comparison of frequency distributions for each of the sites identified that there were various interpretations of the variable "Compensable Status". It was thus possible to contact study sites and correct these data prior to analysis.

Only after the data had been thoroughly investigated in this manner was an attempt made to group observations. The grouping of the data constituted the second stage of the analysis. Cost of care was used as the response variable, measured firstly as a daily average and, in a second attempt to group, as a total per episode. Two different computer programs were used to formulate classes, as each had advantages over the other. CART (a Classification and Regression Tree computer package) was used to find a first solution. Explanatory variables were selected by the program from the variety of demographic and clinical measurements recorded for patients. The "best" tree was selected as that which accounted for the largest proportion of variation in the cost of care, the response variable. As this tree was not necessarily clinically the most sensible, PC-Group (a second computer package designed to create regression trees), was used to refine the classification.

The ultimate aim of the analysis was to form distinct groups within the data, such that patients within each group were similar to each other, but different from patients in the other groups. Similarity and dissimilarity between patients was measured by the cost of care, and groups were to be defined in terms of clinical and other attributes of the patients.

Explanatory variables are compared to find the one which could best split the data into two homogeneous groups that were as different from one another as possible. These two groups would then be further split, sometimes using the same explanatory variable, sometimes another. Successive binary splits were performed on the data until there was no significant improvement to be made. At that time, the best classification solution would have been reached.

The data could be divided in many different ways to form alternative sets of classification groups. Each of these alternatives needed to be evaluated and compared with other options. Typically, the criterion used in such an evaluation is the proportion of the sum of squared deviations about the means that is explained by the classes. This is generally expressed as the percentage of variation, or the proportion of the variance of the response variable, that can be explained by the selected groups.

However, as outlined in Section 5.6, the evaluation of the options involved not only statistical criteria but also clinical considerations. Details of the method used are given in Section 5.6. Results appear in Section 6. Details of the two computer programs - CART and PC-Group - may be found in the software manuals.[26 27]

After the classes had been created, they had to be examined, one by one, for outlying cases. Several trimming techniques were considered. To decide on the best technique, a number of criteria were considered. The method employed had to be able to isolate low cost as well as high cost outliers. The method of trimming had to be statistically defensible. It was considered not to be necessary to trim severely at this stage. Some of the techniques that were examined would have resulted in more than 20% of episodes being removed. This was considered to be unacceptably high. It needs to be stated that the degree of variability within classes that is acceptable during the development of the classification may not be acceptable when rules for the allocation of funds are being determined. It is possible that, when funding is being considered, a more severe technique for the selection of outliers may be appropriate.

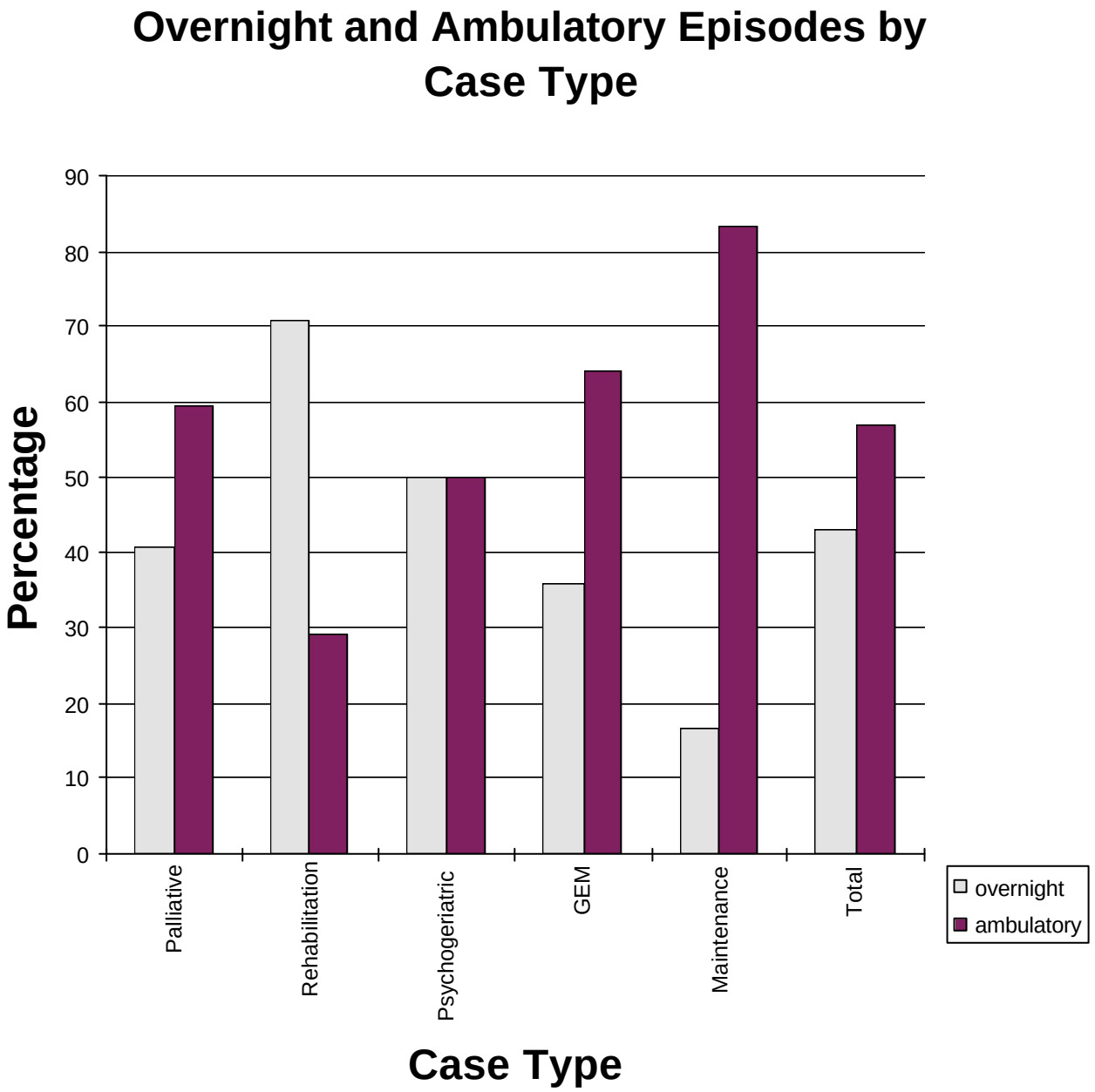
Outliers were considered to be atypical values of the natural logarithm of the core cost rather than the cost itself. A value was considered to be atypical within a class if it was more than 1.5 times the interquartile range above the third quartile or more than 1.5 times the interquartile range below the first quartile of its class. For the majority of classes, the natural logarithm of the core cost was Normally distributed. For the remaining classes, the distribution of the natural logarithm of the core cost was symmetric. Strictly speaking, it is not necessary to have a symmetric distribution to apply the interquartile range trim. However, a symmetric distribution increases the likelihood of detecting both low cost and high cost outliers.

The results of this trim are outlined in sections 5.6 and 5.7. Details of costs for each class were calculated using the trimmed data and are recorded in Appendix 14.

5.2 Descriptive analysis of the full sample

Figure 41 shows the mix of overnight and ambulatory episodes for each Case Type. Ambulatory episodes include same day, outpatient and community episodes.

Figure 41



There were significant differences between the Case Types. The majority of Rehabilitation episodes were overnight episodes. Psychogeriatric episodes occurred equally in overnight and ambulatory care. The majority of Palliative Care, GEM and Maintenance episodes were ambulatory.

The actual number of ambulatory episodes by Episode Type is shown in Figure 42. Rehabilitation differed from the other four Case Types in that the majority of ambulatory rehabilitation were classified as outpatient. For the other Case Types, the majority of ambulatory care was classified as community care.

Figure 42 The Overnight and Ambulatory Data Sets

		OVERNIGHT	AMBULATORY		
			Same day patient	Outpatient	Community client
CASE TYPE	Palliative care	1,849	58	143	2,480
	Rehabilitation	7,303	598	1,721	737
	Psychogeriatric	473	13	98	360
	Geriatric evaluation and management	1,817	258	625	2,298
	Maintenance care	1,533	65	794	6,834
	TOTAL	**12,975**	**992**	**3,381**	**12,719**

Figure 43 shows the profile of episodes provided by private sector sites. The private sector as a percentage of the total sample is shown in brackets. In total, private sector episodes represented 14.26% of the total sample. However, there were significant differences by Episode Type and by Case Type. The majority (75.45%) of private sector episodes were overnight episodes and two Case Types were dominant - rehabilitation and palliative care. 30.78% of all rehabilitation, 16.95% of all palliative care and 24.96% of all overnight episodes were provided by private sector sites.

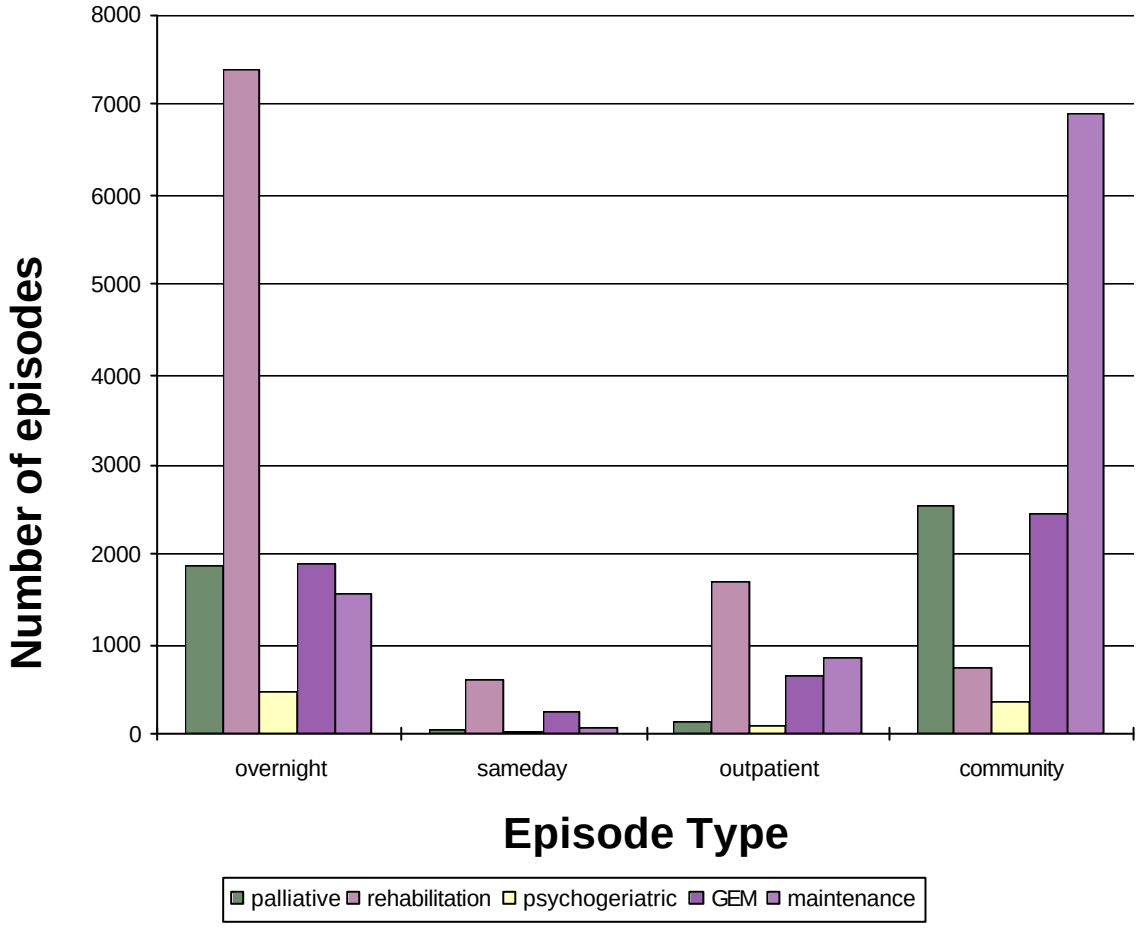
Figure 43 Private Sector Episodes

		EPISODE TYPE				
		Overnight patient	Same day patient	Out patient	Community client	**TOTAL**
CASE TYPE	Palliative care	481	4	0	294	**779 (16.95%)**
	Rehabilitation	2,469	126	618	1	**3214 (30.78%)**
	Psychogeriatric	1	0	0	0	**1 (0.11%)**
	GEM	99	8	1	16	**124 (2.37%)**
	Maintenance	243	3	0	0	**246 (2.63%)**
	TOTAL	**3293 (24.96%)**	**141 (14.24%)**	**619 (17.89%)**	**311 (2.40%)**	**4364 (14.26%)**

5.3 Descriptive analysis of the Episode data

Figure 44 shows the sample by type of episode - overnight episodes, same day episodes, outpatient episodes and community episodes. For all episode types, the unit of counting was the full sequence of care from episode start to episode end, rather than the day or the occasion of service. This included same day episodes. This approach differs from the current model used in Australia whereby each day of care for a same day admitted patient is separately counted and classified. Likewise, the approach of counting the full sequence of outpatient care and the full sequence of community care as one episode differs from the current model whereby the unit of counting is the individual occasion of service.

Figure 44 Number of Episodes by Episode Type



5.3.1 Overnight episodes

Figure 45 shows the Australian overnight sample by State/Territory. As outlined in Section 2.1, States and Territories were to be included in the sample in proportion to total population in each State/Territory. No such criterion was applied to ambulatory episodes.

Relative to population, three States were over-represented in the sample - NSW, Victoria and South Australia. South Australia was proportionally the most over-represented. The other States and Territories were all proportionally under-represented. Western Australia was proportionally the most under-represented, followed by the Australian Capital Territory and Queensland. Tasmania and the Northern Territory were both a little below initial estimates.

One reason for this result is that the sampling framework included the over-sampling of low volume, high cost cases. These cases are more likely to be treated in specialised units and it appears that the States of NSW, Victoria and South Australia have proportionally more specialised units (such as brain injury and spinal injury units) than the other States. A further reason is that the great majority of private sector services are provided in NSW, Victoria and South Australia.

Figure 45 Overnight Sample by State/Territory

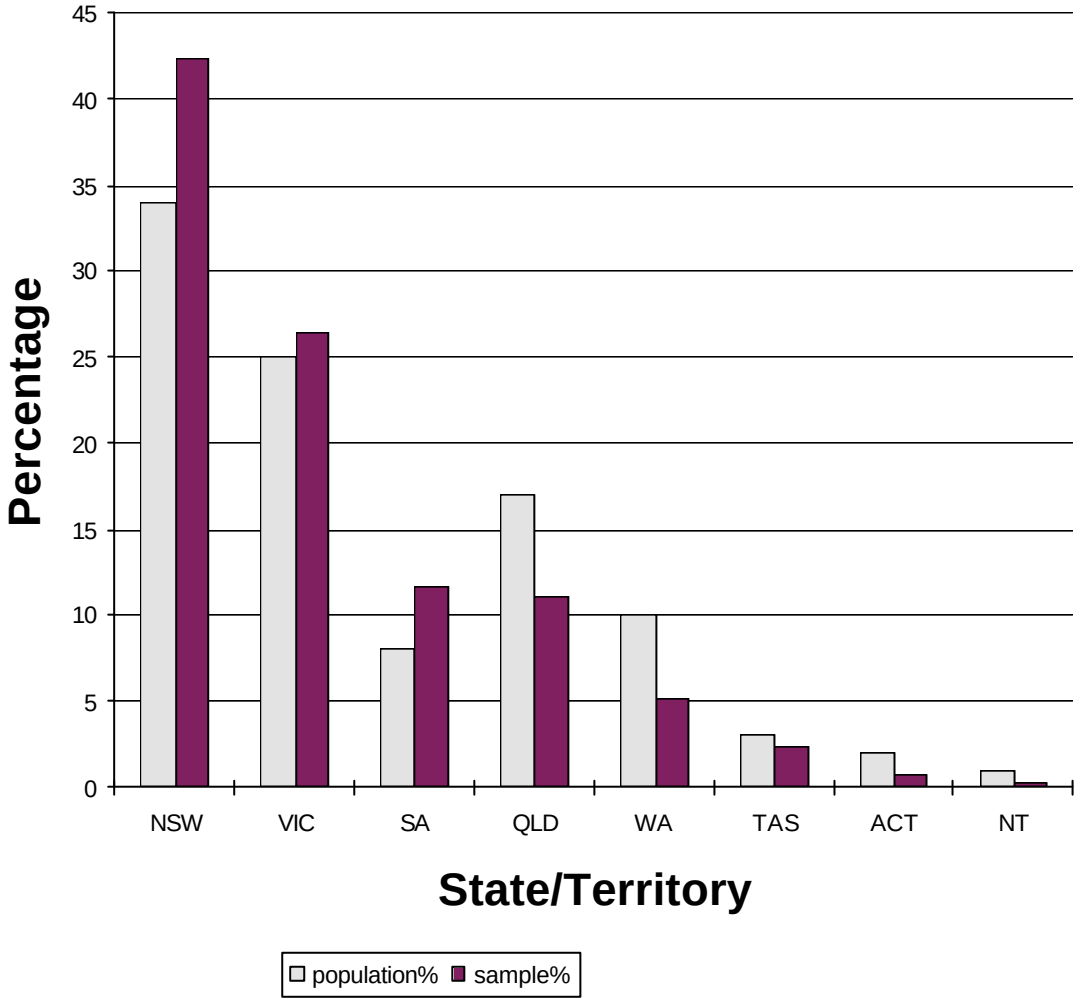


Figure 46 shows summary statistics for the total overnight sample. This includes both assessment and treatment episodes and both complete and straddle episodes (see Section 4.4.1).

Figure 46 Selective Summary Statistics - Overnight Episodes

Variable	Mean	Standard Deviation
length of stay (total)	84.58	678.95
length of stay in study period	21.43	19.90
age	72.48	15.48
core cost per day	$252.64	$117.92

core cost per episode (incl. straddle episodes)	$5,414.18	$6,145.63

As an initial exploration of the data, relationships between these variables were tested using a Pearson Correlation Coefficient. The results are shown in Figure 47. The level of statistical significance (p value) is shown in brackets. The strongest correlation was between length of stay and core episode cost (0.81). Whilst the correlation was significant, the figure of 0.81 does suggest that caution should be exercised in using length of stay as a proxy for cost for these episodes. The other correlations were all very weak. Although it is very weak, the negative correlation between age and cost is interesting. It would appear to result from the inclusion of young traumatic spinal and brain injury patients in the data set.

Figure 47 Pearson Correlation Coefficients - overnight episodes

	core cost per day	core cost per episode
length of stay (total)	-0.06788 (0.0001)	0.11494 (0.0001)
length of stay in study period	0.01228 (0.1619)	0.80759 (0.0001)
age	-0.13554 (0.0001)	-0.14248 (0.0001)

Figures 48 to 52 show data on variables that were collected for all five Case Types. Variables not collected for all Case Types are reported in Section 5.4.

Figure 48 shows the number of 'Assessment Only' episodes. These were episodes in which the person was seen only for assessment or for a one-off treatment event and from which no further intervention was planned. No further information was collected about these episodes. Across all five Case Types, 0.6% of patients were seen for assessment only.

Figure 48 Assessment Only Episodes - Overnight Episodes

	number	percentage
yes	84	0.6
no	12,888	99.4

Figure 49 shows results for the variable 'Need for Interpreter'. This item required participating staff to record the need for interpreter services (yes/no) as perceived by the person. The actual provision or not of interpreter services was not relevant to this item.

Figure 49 Need for Interpreter - Overnight Episodes

	number	percentage
yes	673	5.2

no	12,215	94.8

Figure 50 shows results for the variable 'Aboriginality'. This item required participating staff to record if the person was Aboriginal or Torres Strait Islander as perceived by the person. New Zealand sites recorded Maori or Pacific Islander as identified by the person.

Figure 50 Aboriginality - Overnight Episodes

	number	percentage
yes	112	0.9
no	12,276	99.1

Figure 51 shows the reason for the start of the overnight episodes. Almost half of the episodes began by a transfer from another hospital. The next most common reason was a direct admission from home / other accommodation, followed by a ward transfer from acute care. There were significant differences between Case Types on this variable. The profile by Case Type is discussed in Section 5.4.

Figure 51 Reason for Episode Start - Overnight Episodes

Reason	number	percentage
Admitted from a nursing home	391	3.0
Admitted from other accommodation/home	3,973	30.8
Transferred from another hospital	6,104	47.4
Transferred from acute care in another ward in this hospital	1,729	13.4
Change from acute care to a SNAP Case Type whilst remaining on the same ward	335	2.6
Change of Case Type within SNAP	350	2.7
Statistical admission from leave	5	0.0

Figure 52 shows the reason for the end of the overnight episodes. 57.8% of episodes ended with the patient being discharged to home or to other accommodation. The next most common reason was discharge to a nursing home. These episodes were predominantly maintenance, psychogeriatric and GEM episodes (see Section 5.4). The episode ended with the death of the patient in 10.2% of all episodes. These episodes were predominantly, but not exclusively, palliative care episodes. 8.9% of all overnight patients were still in care at the end of the study period.

Figure 52 Reason for Episode End - Overnight Episodes

Reason	number	percentage
Discharged to a nursing home	1,491	11.6
Discharged to other accommodation	7,447	57.8
Died	1,320	10.2
Discharged/transferred to another hospital	940	7.3
Change from a SNAP Case Type to acute care and transferred to a different ward	92	0.7
Change from a SNAP Case Type to acute care whilst remaining on the same ward	73	0.6
Change of Case Type within SNAP	269	2.1
Discharge own risk	67	0.5
Statistical discharge from leave	26	0.2
Still in care at end of study	1,145	8.9

5.3.2 Ambulatory episodes

This section summarises key descriptive statistics on the three ambulatory episode types - same day, outpatient and community. It begins by Figures 53 to 55 showing summary statistics for each of the ambulatory episode types. This includes both assessment and treatment episodes and both complete and straddle episodes (see Section 4.4.1).

Patients having same day episodes were, on average, nearly 7 years younger than their overnight counterparts. They were seen on an average of 13 days each over the three months of data collection. They had a core average daily cost of $121, about 48% of the cost of an overnight episode. At $1,507 an episode, same day episodes cost about 28% of the cost of an overnight episode.

Figure 53 Selective Summary Statistics - Same day Episodes

Variable	Mean	Standard Deviation
number of days seen in study period	12.67	13.82
age	65.64	18.51
core cost per day	$119.00	$106.22
core cost per episode (incl. straddle episodes)	$1,507.73	$2,538.35

Outpatients were the youngest group - on average, 4 years younger than same days and 11 years younger than overnights. They were seen on an average of 7 days each over the three months of data collection. With a core average daily cost of $63, they were about half of the cost of a same day patient and a quarter the cost of an overnight patient. At $551 an episode, outpatient episodes cost about 37% of the cost of a same day episode and 10% the cost of an overnight episode.

Figure 54 Selective Summary Statistics - Outpatient Episodes

Variable	Mean	Standard Deviation
number of days seen in study period	6.78	8.23
age	61.37	19.74
core cost per day	$81.29	$65.65
core cost per episode (incl. straddle episodes)	$551.14	$1,461.34

Community clients had an average episode cost that is similar to outpatients. They were the oldest of the ambulatory groups and were seen on an average of 10 days during the three months collection period. With a core average daily cost of $58, they were about half the cost of a same day patient and a quarter the cost of an overnight patient. At $547 an episode, community episodes cost about 37% of the cost of a same day episode and 10% the cost of an overnight episode.

Figure 55 Selective Summary Statistics - Community Episodes

Variable	Mean	Standard Deviation
number of days seen in study period	10.26	13.83
age	69.93	18.73
core cost per day	$53.34	$53.78
core cost per episode (incl. straddle episodes)	$547.28	$933.72

The relationships between the above variables were tested using a Pearson Correlation Coefficient. The results for each Episode Type were shown in Figures 56 to 58. The level of statistical significance is shown in brackets. For the same day episodes shown in Figure 56, the correlation between the number of days seen and core episode cost was identical to overnights (0.81). All other correlations are very weak.

Figure 56 Pearson Correlation Coefficients - same day episodes

	core cost per day	core cost per episode
number of days seen in study period	-0.01734 (0.5847)	0.80759 (0.0001)
age	0.12142 (0.0001)	-0.10466 (0.0009)

The results for outpatients are shown in Figure 57. The correlation between the number of days seen and the core episode cost was, at 0.72, weaker than that of either overnight episodes or same day episodes. Again, all other correlations were very weak.

Figure 57 Pearson Correlation Coefficients - outpatient episodes

	core cost per day	core cost per episode
number of days seen in study period	0.23053 (0.0001)	0.72055 (0.0001)
age	-0.03221 (0.0612)	-0.10987 (0.0001)

Figure 58 shows the results for community clients. At 0.67, the correlation between the number of days seen and core episode cost was the weakest of any of the four Episode Types. The other correlations, though statistically significant, are negligible.

Figure 58 Pearson Correlation Coefficients - community episodes

	core cost per day	core cost per episode
number of days seen in study period	-0.06860 (0.0001)	0.66745 (0.0001)
age	-0.05383 (0.0001)	-0.03637 (0.0001)

Figures 59 to 63 show data on variables that were collected for all five Case Types. Variables not collected for all Case Types are reported in Section 5.4.

Figure 59 shows the number of 'Assessment Only' episodes. These were episodes in which the person was seen only for assessment or for a one-off treatment event and from which no further intervention was planned. No further information was collected about these episodes. There was a significant difference between outpatients and the other ambulatory episodes with 43% of outpatient episodes being classified as 'Assessment Only'.

Figure 59 Assessment Only Episodes - Ambulatory Episodes

	Same day		Outpatient		Community	
	number	percentage	number	percentage	number	percentage
yes	182	18.3	1,440	42.6	2,678	21.1
no	814	81.7	1,941	57.4	10,034	78.9

Figure 60 shows results for the variable 'Need for Interpreter'. This item required participating staff to record the need for interpreter services (yes/no) as perceived by the person. The actual provision or not of interpreter services was not the focus of this item.

Figure 60 Need for Interpreter - Ambulatory Episodes

	Same day		Outpatient		Community	
	number	percentage	number	percentage	number	percentage
yes	30	3.7	51	2.6	339	3.4
no	784	96.3	1,890	97.4	9,694	96.6

Figure 61 shows results for the variable 'Aboriginality'. This item required participating staff to record if the person was Aboriginal or Torres Strait Islander as perceived by the person. New Zealand sites recorded Maori or Pacific Islander as identified by the person.

Figure 61 Aboriginality - Ambulatory Episodes

	Same day		Outpatient		Community	
	number	percentage	number	percentage	number	percentage
yes	7	0.9	32	1.6	253	2.5
no	807	99.1	1,909	98.4	9,781	97.5

Figure 62 shows the reason for the start of the ambulatory episodes. The majority of all episodes began by a direct contact following referral (including self-referral). Just over a quarter of outpatient episodes began as a result of transfer from inpatient hospital care. More community episodes began with a change from primary or acute care than either same day or outpatient episodes. There were significant differences between Case Types on this variable. The profile by Case Type is discussed in Section 5.4.

Figure 62 Reason for Episode Start - Ambulatory Episodes

	Same day		Outpatient		Community	
	number	%	number	%	number	%
First contact following referral	528	64.9	1,080	55.6	7,132	71.1
Transferred from being an overnight patient	125	15.4	559	28.8	1,189	11.8
Change from primary or acute to a SNAP Case Type	50	6.1	118	6.1	1,419	14.1
Change of Case Type within SNAP	26	3.2	21	1.1	193	1.9

Change of episode type	82	10.1	157	8.1	100	1.0

Figure 63 shows results for the variable 'Sole Practitioner'. This item required participating staff to record if the person received interventions from only one health care professional discipline and not from a multidisciplinary team who participated in the provision of assessment and/or treatment services. Four of the five Case Types (all but Maintenance Care) included multidisciplinary care as one of the features of the Case Type. Nevertheless, 35% of community clients, 17% of outpatients and 13% of same day patients were identified as receiving Sole Practitioner services.

Figure 63 Sole Practitioner - Ambulatory Episodes

	Same day		Outpatient		Community	
	number	percentage	number	percentage	number	percentage
yes	104	12.8	321	16.5	3,515	35.1
no	710	87.2	1,620	83.5	6,503	64.9

Figure 64 shows why ambulatory episodes ended. Two thirds of the same day and half of the outpatient episodes ended with a case closure / discharge. The majority (57%) of the community clients, and 42% of the outpatients, were still in care at the end of the study period. The episode ended a transfer to hospital or the death of the patient in 9.3% and 7.9% of all episodes respectively. In both cases, these episodes were predominately, but not exclusively, palliative care episodes (see Section 5.4).

Figure 64 Reason for Episode End - Ambulatory Episodes

	Same day		Outpatient		Community	
	number	%	number	%	number	%
Discharge / case closure	542	66.6	975	50.2	2,498	24.9
Died	31	3.9	16	0.8	789	7.9
Admitted to hospital as overnight patient	32	3.9	92	4.7	931	9.3
Change to acute or primary care	8	1.0	6	0.3	36	0.4
Change of Case Type within SNAP	13	1.6	9	0.5	43	0.4
Change of episode type	3	0.4	12	0.6	20	0.2
Still in care at episode end	181	22.2	824	42.5	5,715	57.0

5.4 Descriptive analysis of the Case data

5.4.1 Palliative Care

This section summarises key descriptive statistics on the palliative care episodes - overnight, same day, outpatient and community. It begins by showing summary statistics for each of the four episode types. This includes both assessment and treatment episodes and both complete and ongoing episodes (see Section 4.4.1).

Figure 65 shows summary statistics for the overnight episodes. For the purposes of this analysis, the Bereavement Phase was allocated a length of stay of one day. Relative to the total overnight episode data set (see Section 5.3), palliative care overnight episodes were $25 per day more expensive and $1,638 an episode less expensive than the average. This difference is due to the significantly shorter duration of palliative care episodes (14 days compared to 21 days across all Case Types). Overnight palliative care patients were 4 years younger than the average overnight patient in the study.

Figure 65 Selective Summary Statistics - Overnight Palliative care

Variable	Mean	Standard Deviation
length of stay (total, including bereavement)	28.14	40.13
length of stay in study period (incl bereavement)	13.61	15.51
age	68.63	14.24
core cost per day (incl. bereavement)	$277.41	$124.86
core cost per episode	$3,775.68	$4,430.04

As seen in Figure 66, patients having same day episodes were, on average, 4 years younger than their overnight counterparts. They were seen on an average of 3 days each over the three months of data collection. They had a core average daily cost of $175, although this figure is perhaps distorted because the Bereavement Phase was allocated an episode duration of one day. At $546 an episode, same day episodes were about 14% of the cost of an overnight episode.

Figure 66 Selective Summary Statistics - Same Day Palliative care

Variable	Mean	Standard Deviation
no. of days seen in study period (incl. bereave.)	3.13	4.05
age	64.19	17.72
core cost per day (incl. bereavement)	$174.50	$178.15
core cost per episode	$546.19	$884.44

Outpatients (Figure 67) were the youngest group - on average, 1 year younger than same days and 5 years younger than overnights. They were seen on an average of 6 days each over the three months of data collection. With a core average daily cost of $52, they were about 19% the cost of an overnight patient. At $291 an episode, an outpatient episode cost about the same as one day of overnight care.

Figure 67 Selective Summary Statistics - Outpatient Palliative care

Variable	Mean	Standard Deviation
no. of days seen in study period (incl. bereave.)	5.61	7.11
age	63.34	15.24
core cost per day (incl. bereavement)	$51.93	$52.71
core cost per episode (incl. bereavement)	$291.34	$547.19

As seen in Figure 68 community clients had an average daily cost that was 80% higher than outpatients. They were 2 years younger than the overnight patients and were seen on an average of 10 days each during the three months collection period. With a core average daily cost of $87, they were about 31% of the cost of an overnight patient. At $826 an episode, community episodes were about 22% of the cost of an overnight episode.

Figure 68 Selective Summary Statistics - Community Palliative care

Variable	Mean	Standard Deviation
no. of days seen in study period (incl. bereave.)	9.46	9.66
age	66.76	14.57
core cost per day (incl. bereavement)	$87.32	$77.77
core cost per episode (incl. bereavement)	$826.07	$1390.05

The relationship between these variables was tested using a Pearson Correlation Coefficient. The results are shown in Figures 69 to 72. The level of statistical significance is shown in brackets.

The results for overnight palliative care are shown in Figure 69. The strongest correlation was between length of stay and core episode cost (0.86). All other correlations were very small. The two negative correlations suggest that older patients cost less on a daily basis than younger patients, and that shorter episodes have higher daily costs.

Figure 69 Pearson Correlation Coefficients - Overnight Palliative care

	core cost per day	core cost per episode
length of stay (total)	0.02551 (0.3461)	0.55640 (0.0001)
length of stay in study period	-0.10605 (0.0001)	0.85957 (0.0001)
age	-0.08483 (0.0017)	0.00857 (0.7516)

For the same day episodes shown in Figure 70, the correlation between the number of days seen and core episode cost was weaker than that found for other Case and Episode Types. There was no significant correlation between age and cost.

Figure 70 Pearson Correlation Coefficients - Same Day Palliative care

	core cost per day	core cost per episode
number of days seen in study period	-0.09424 (0.5241)	0.77567 (0.0001)
age	0.03723 (0.8012)	0.04537 (0.7595)

The results for outpatients are shown in Figure 71. The correlation between the number of days seen and the core episode cost was, at 0.88, stronger than that of any of the other Episode Types. Again, there was no significant correlation between age and cost per day.

Figure 71 Pearson Correlation Coefficients - Outpatient Palliative care

	core cost per day	core cost per episode
number of days seen in study period	0.11891 (0.2784)	0.87796 (0.0001)
age	-0.01852 (0.8664)	-0.10050 (0.3601)

Figure 72 shows the results for community clients. At 0.66, the correlation between the number of days seen and core episode cost was relatively weak. There was no correlation between cost and age.

Figure 72 Pearson Correlation Coefficients - Community Palliative care

	core cost per day	core cost per episode
number of days seen in study period	0.10742 (0.0001)	0.65958 (0.0001)
age	-0.02703 (0.3172)	-0.05075 (0.0603)

The remaining tables in this section provide descriptive statistics on both palliative care phases and on palliative care episodes. The data discussed in the remainder of this section include all episodes, including those that straddled the start and end points of the study. Figure 73 shows the number of 'Assessment Only' episodes. These were episodes in which the person was seen only for assessment or for a one-off treatment event and from which no further intervention was planned. No further information was collected about these episodes. As would be expected, the number of 'Assessment Only' episodes was negligible for all Episode Types.

Figure 73 Assessment Only Episodes - Palliative care

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
yes	1	0.03	1	1.52	1	0.81	3	0.09
no	3,860	99.97	65	98.48	123	99.19	3,478	99.91

Figure 74 shows the reason for the start of overnight palliative care episodes. The majority (60%) of episodes began as a direct admission from home. This was followed by transfer from another hospital (29%).

Figure 74 Reason for Episode Start - Overnight Palliative care

Reason	number	percentage
Admitted from a nursing home	44	2.4
Admitted from other accommodation/home	1,100	59.6
Transferred from another hospital	533	28.9
Transferred from acute care in another ward	80	4.3
Change from acute care to a SNAP Case Type whilst remaining on the same ward	29	1.6
Change of Case Type within SNAP	49	2.7
Statistical admission from leave	2	0.1

Figure 75 shows the reason for the start of the ambulatory palliative care episodes. The majority of episodes began by a direct contact following referral (including self-referral). 13.5% of episodes began as a result of transfer from overnight hospital care and 15% of ambulatory episodes began with a change from primary or acute care.

Figure 75 Reason for Episode Start - Ambulatory Palliative care

	number	percentage
First contact following referral	1,546	64.6
Transferred from being an overnight patient	324	13.5
Change from primary or acute	360	15.1
Change of Case Type within SNAP	90	3.8
Change of episode type	72	3.0

Figure 76 shows results for the variable 'Sole Practitioner'. This item required participating staff to record if the person received interventions from only one health care professional discipline and not from a multidisciplinary team who participated in the provision of assessment and/or treatment services. The definition of the Palliative Care Case Type specified multidisciplinary care as one of the criteria. Nevertheless, 21% of community clients, 20% of outpatients and 14% of same day patients were identified as receiving Sole Practitioner palliative care.

The definition of multidisciplinary assessment and/or management employed in the study is included in Appendix 4. This definition recognised that, in the ambulatory setting, multidisciplinary care could include direct care provided by only one health care provider if that health care provider had access to other disciplines for consultation, there was a multidisciplinary case conference, and there was a mechanism for ongoing multidisciplinary review.

Figure 76 Sole Practitioner - Ambulatory Palliative care

	Same day		Outpatient		Community	
	number	percentage	number	percentage	number	percentage
yes	9	13.9	24	19.5	725	20.9
no	56	86.1	99	80.5	2,738	79.1

A summary of the data on Palliative Care phases is presented in Figure 77. Participating sites recorded an initial palliative care phase for each patient at the start of the episode. They were then able to record a phase change at any point throughout the episode. A change of phase triggered a new Severity Score and a new RUG-ADL score.

Figure 77 gives the number and percentage of phases for each Episode Type. The distribution of phases for the overnight episodes was quite even, with a range of 16.5% for the stable phase through to 22.8% for the unstable phase. The number of same day episodes was quite small with more than half of the phases being either stable or bereavement. The distribution of the outpatient phases was different, with almost 60% being stable. There were only a small number in the terminal or bereavement phases. The majority of community phases were stable or unstable. Relative to the overnight episodes, there were fewer terminal and bereavement phases.

Figure 77 Palliative Care Phases

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
stable	637	16.5	19	28.8	71	57.3	1,081	31.1
unstable	880	22.8	14	21.2	21	16.9	929	26.7
deteriorating	851	22.0	4	6.1	21	16.9	675	19.4
terminal	719	18.6	13	19.7	5	4.0	308	8.9
bereaved	774	20.1	16	24.2	6	4.8	488	14.0
Total phases	**3,861**	**100.0**	**66**	**100.0**	**124**	**100.0**	**3,481**	**100.0**

Figure 78 shows the relationship between phases and episodes. On average, the overnight patients had 1.3 phases per admission, including any bereavement phases. When the bereavement phase is removed, the number of phases per admission drops to 1.1. The other large episode group were the community episodes. Not surprisingly, they averaged more phases per episode.

The number of phases per episode was fewer than anticipated. However, it may be attributed to the relatively short episode duration of palliative care episodes. As shown in Figures 82 and 83, palliative care episodes often ended with the patient being transferred between overnight and ambulatory care. It may be that a change of the setting of care represented a change in the phase of care.

Figure 78 Relationship between Palliative Care Episodes and Phases

	Overnight	Same day	Outpatient	Community
Total Phases	3,861	66	124	3,481
Total Episodes	2,950	55	73	2,064
Mean no. of phases per episode incl. Bereaved	1.31	1.20	1.70	1.69
Mean no. of phases per episode excl Bereaved	1.10	0.91	1.62	1.45

Figure 79 shows results on the Palliative Care Severity scale. This 4 point scale was re-coded during the data preparation stage from its original scale (0 - 3) to new codes (1 - 4). This was undertaken to distinguish a score of 0 from a missing value. The scale has four items and a score of 0 on any item indicated that there were no problems. A score of 3 indicated severe problems. The data in Figure 79 are based on the re-coded values. The higher the score, the higher the severity. The pattern was different for the overnight and community patterns. The scores for the overnight episodes tended to be higher, whilst the scores for the community episodes tended to be a little lower.

Figure 79 - Palliative Care Severity Scores - totals

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
score 4 - 7	205	6.6	7	14.0	19	16.1	469	15.7
score 8 - 10	854	27.7	17	34.0	45	38.1	1,200	40.1
score 11-13	1,128	36.5	16	32.0	41	34.7	958	32.0
score 14-16	900	29.2	10	20.0	13	11.0	366	12.2
Total	3,087	100.0	50	100.0	118	100.0	2,993	100.0

Summary data on the RUG-ADL at phase start are shown in Figure 80. There were significant differences between the profile of the overnight and ambulatory episodes with the overnight episodes having lower motor function at episode start.

Figure 80 RUG-ADL at Phase Start - Palliative Care

	Overnight	Same day	Outpatient	Community
Mean	12.8	10.9	6.7	8.1
Median	14.0	11.5	4.0	4.0

The RUG-ADL was also captured at the end of each episode. The item was left blank if the episode ended with the death of the patient. The motor function of the overnight patients improved over the course of the episode, as did that of the same day and outpatients. The level of improvement was most dramatic for same days. The community episodes showed the opposite trend with both the mean and median scores indicating that motor function had declined from episode start to episode end.

Figure 81 RUG-ADL at Phase End - Palliative Care

	Overnight	Same day	Outpatient	Community
Mean	12.4	7.4	7.5	8.9
Median	14.0	4.0	4.0	8.0

Figure 82 shows the reason for the end of the overnight episodes. 8% of all overnight patients were still in care at the end of the study period. 56% of episodes ended with the death of the patient or the end of bereavement support. The next most common reason was discharge to home (27.3%). Many of these patients then began a community palliative care episode provided by either the same service or another service participating in the study. This movement between treatment settings appears to have resulted in the overnight palliative care episodes being of relatively short duration and relatively low episode cost. It may also have accounted for the relatively low ratio of phases to episodes reported in this study. As a person moved from one phase to another, the data suggest that the setting may also have changed.

Figure 82 Reason for Episode End - Overnight Palliative care

Reason	number	%
Discharged to a nursing home	58	3.1
Discharged to other accommodation	505	27.3
Died / bereavement phase end	1,041	56.4
Discharged / transferred to another hospital	76	4.1
Change to acute care and transfer to a different ward	0	0.0
Change to acute care whilst remaining on same ward	2	0.1
Change of Case Type within SNAP	10	0.5
Discharge own risk	5	0.3
Statistical discharge from leave	12	0.6
Still in care at end of study	138	7.5

Figure 83 shows why ambulatory episodes ended. 42% of the ambulatory patients were still in care at the end of the study. 26% of episodes ended with the death of the patient or the end of bereavement support. This was about half the number for the overnight episodes. The next most common reason was admission to hospital (23%). Again, many of these patients then began an overnight palliative care episode provided by either the same service or another service participating in the study. Like the overnight episodes, the movement between treatment settings appears to have resulted in the ambulatory palliative care episodes being of relatively short duration and relatively low episode cost.

Figure 83 Reason for Episode End - Ambulatory Palliative care

Reason	number	percentage
Discharge / case closure	170	7.1
Died / bereavement phase end	629	26.3
Admitted to hospital as overnight patient	557	23.3
Change to acute or primary care	4	0.2
Change of Case Type within SNAP	4	0.2
Change of episode type	20	0.8
Still in care at episode end	1,007	42.1

5.4.2 Rehabilitation

This section summarises key descriptive statistics on the rehabilitation episodes - overnight, same day, outpatient and community. It begins by showing summary statistics for each of the four episode types. This includes both assessment and treatment episodes and both complete and ongoing episodes (see Section 4.4.1).

Figure 84 shows summary statistics for the overnight episodes. Relative to the total overnight episode data set (see Section 5.3), rehabilitation overnight episodes were $12 per day and $383 per episode more expensive than the average. With an average length of stay of 22 days, rehabilitation episodes were one day longer than the mean for all overnight episodes. Overnight rehabilitation patients were 2 years younger than the average overnight patient.

Figure 84 Selective Summary Statistics - Overnight Rehabilitation

Variable	Mean	Standard Deviation
length of stay (total)	23.70	25.05
length of stay in study period	21.81	16.28
age	70.53	16.78
core cost per day	$265.79	$114.11
core cost per episode	$5,796.93	$6,231.82

As seen in Figure 85, patients having same day episodes were, on average, 7 years younger than their overnight counterparts. They were seen on an average of 13 days each over the three months of data collection. They had a core average daily cost of $118, about 44% of the cost of an overnight episode. At $1,572 an episode, same day episodes were about 27% of the cost of an overnight episode.

Figure 85 Selective Summary Statistics - Same Day Rehabilitation

Variable	Mean	Standard Deviation
number of days seen in study period	13.36	12.71
age	63.59	17.96
core cost per day	$117.69	$85.48
core cost per episode	$1,572.38	$2,263.21

Outpatients (Figure 86) were the youngest group - on average, 6 years younger than same days and 13 years younger than overnights. They were seen on an average of 8 days each over the three months of data collection. With a core average daily cost of $94, they were about 80% of the cost of a same day patient and 35% the cost of an overnight patient. At $781 an episode, outpatient episodes were about half the cost of a same day episode and 14% the cost of an overnight episode.

Figure 86 Selective Summary Statistics - Outpatient Rehabilitation

Variable	Mean	Standard Deviation
number of days seen in study period	8.34	9.79
age	57.62	19.89
core cost per day	$93.62	$65.19
core cost per episode	$780.75	$2,217.49

As seen in Figure 87, community clients had an average daily cost that was about 17% higher than outpatients. They were 3 years younger than outpatients and were seen on an average of 7 days during the three months collection period. With a core average daily cost of $84, they were about 72% of the cost of a same day patient and 32% of the cost of an overnight patient. At $608 an episode, community episodes were about 39% of the cost of a same day episode and 11% the cost of an overnight episode.

Figure 87 Selective Summary Statistics - Community Rehabilitation

Variable	Mean	Standard Deviation
number of days seen in study period	7.19	7.48
age	60.39	23.51
core cost per day	$84.49	$57.31
core cost per episode (incl. straddle episodes)	$607.51	$918.34

The relationship between these variables was tested using a Pearson Correlation Coefficient. The results are shown in Figures 88 to 91. The level of statistical significance is shown in brackets.

The results for overnight rehabilitation are shown in Figure 88. The strongest correlation was between length of stay and core episode cost (0.84). There were very weak correlations between age and both daily cost and episode cost. The fact that they are negative was no doubt influenced by the inclusion of young traumatic spinal and brain injury patients in the data set.

Figure 88 Pearson Correlation Coefficients - Overnight Rehabilitation

	core cost per day	core cost per episode
length of stay (total)	0.15507 (0.0001)	0.76352 (0.0001)
length of stay in study period	0.16693 (0.0001)	0.84402 (0.0001)
age	-0.12216 (0.0001)	-0.15156 (0.0001)

For the same day episodes shown in Figure 89, the correlation between the number of days seen and

core episode cost was a little weaker than that of the overnights. The correlations between age and cost were negligible.

Figure 89 Pearson Correlation Coefficients - Same Day Rehabilitation

	core cost per day	core cost per episode
number of days seen in study period	0.07183 (0.1668)	0.79177 (0.0001)
age	0.12770 (0.0137)	-0.01340 (0.7967)

The results for outpatients are shown in Figure 90. The correlation between the number of days seen and the core episode cost was, at 0.74, weaker than that of either overnight episodes or same day episodes. The correlations between age and cost were negligible.

Figure 90 Pearson Correlation Coefficients - Outpatient Rehabilitation

	core cost per day	core cost per episode
number of days seen in study period	0.35232 (0.0001)	0.73714 (0.0001)
age	0.01140 (0.7285)	-0.09669 (0.0032)

Figure 91 shows the results for community clients. At 0.81, the correlation between the number of days seen and core episode cost was stronger than that of the other ambulatory Episode Types. There was a very weak negative correlation between cost per day and age.

Figure 91 Pearson Correlation Coefficients - Community Rehabilitation

	core cost per day	core cost per episode
number of days seen in study period	-0.11527 (0.0017)	0.80872 (0.0001)
age	-0.23348 (0.0001)	-0.11701 (0.0015)

The remainder of this section provides a descriptive overview of each of the Episode Types. This section includes all episodes, including those that straddled the start and end points of the study.

Figure 92 shows the number of ‘Assessment Only’ episodes. These were episodes in which the person was seen only for assessment or for a one-off treatment event and from which no further intervention was planned. No further information was collected about these episodes. As would be expected, the number of overnight ‘Assessment Only’ episodes was small. However, ‘Assessment Only’ represented nearly 20% of outpatient and community episodes.

Figure 92 Assessment Only Episodes - Rehabilitation

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
yes	39	0.5	51	8.5	310	18.0	147	19.9
no	7,266	99.5	548	91.5	1,411	82.0	590	80.1

Figure 93 shows the reason for the start of overnight rehabilitation episodes. The majority (81%) of episodes began by a transfer from another hospital or from an acute care ward in the same hospital. In contrast to the other Case Types, only 14% began as a direct admission from home.

Figure 93 Reason for Episode Start - Overnight Rehabilitation

Reason	number	percentage
Admitted from a nursing home	109	1.5
Admitted from other accommodation/home	1,028	14.1
Transferred from another hospital	4,622	63.6
Transferred from acute care in another ward	1,268	17.5
Change from acute care to a SNAP Case Type whilst remaining on the same ward	186	2.6
Change of Case Type within SNAP	50	0.7
Statistical admission from leave	2	0.0

Figure 94 shows the reason for the start of the ambulatory rehabilitation episodes. The majority of all episodes began by a direct contact following referral (including self-referral). Over a quarter of outpatient episodes began as a result of transfer from inpatient hospital care. More community episodes began with a change from primary or acute care than either same day or outpatient episodes.

Figure 94 Reason for Episode Start - Ambulatory Rehabilitation

	Same day		Outpatient		Community	
	number	%	number	%	number	%
First contact following referral	528	64.9	1,080	55.6	7,132	71.1
Transferred from being an overnight patient	125	15.4	559	28.8	1,189	11.8
Change from primary or acute to SNAP	50	6.1	118	6.1	1,419	14.1
Change of Case Type within SNAP	26	3.2	21	1.1	193	1.9
Change of episode type	82	10.1	157	8.1	100	1.0

Figure 95 shows results for the variable 'Sole Practitioner'. This item required participating staff to record if the person received interventions from only one health care professional discipline and not from a multidisciplinary team who participated in the provision of assessment and/or treatment services. The definition of the Rehabilitation Case Type specified multidisciplinary care as one of the criteria. Nevertheless, 37% of community clients, 13% of outpatients and 4% of same day patients were identified as receiving Sole Practitioner rehabilitation.

The definition of multidisciplinary assessment and/or management employed in the study is included in Appendix 4. This definition recognised that, in the ambulatory setting, multidisciplinary care could include direct care provided by only one health care provider if that health care provider had access to other disciplines for consultation, there was a multidisciplinary case conference, and there was a mechanism for ongoing multidisciplinary review.

Figure 95 Sole Practitioner - Ambulatory Rehabilitation

	Same day		Outpatient		Community	
	number	percentage	number	percentage	number	percentage
yes	23	4.2	187	13.3	220	37.4
no	525	95.8	1,224	86.7	369	62.6

Figure 96 shows the results for the variable 'First Episode'. This item required participating staff to record (yes/no) if the episode was the person's first admission to any comprehensive medical rehabilitation program for this impairment. There was a significant difference between the overnight and the ambulatory episodes with less than two thirds of ambulatory rehabilitation being the person's first comprehensive rehabilitation program.

Figure 96 First Episode - Rehabilitation

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
yes	6,316	86.9	341	62.2	727	51.5	376	63.7
no	950	13.1	207	37.8	684	48.5	214	36.3

Figure 97 shows the results for the variable 'Compensable'. This identified whether the costs of the episode were covered by an accident compensation claim. There were significant differences between outpatient and other episodes on this variable, with 22% of all outpatient episodes being compensable episodes.

Figure 97 Compensable - Rehabilitation

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
yes	731	10.1	43	7.8	306	21.7	36	6.1
no	6,535	89.9	505	92.2	1,105	78.3	554	93.9

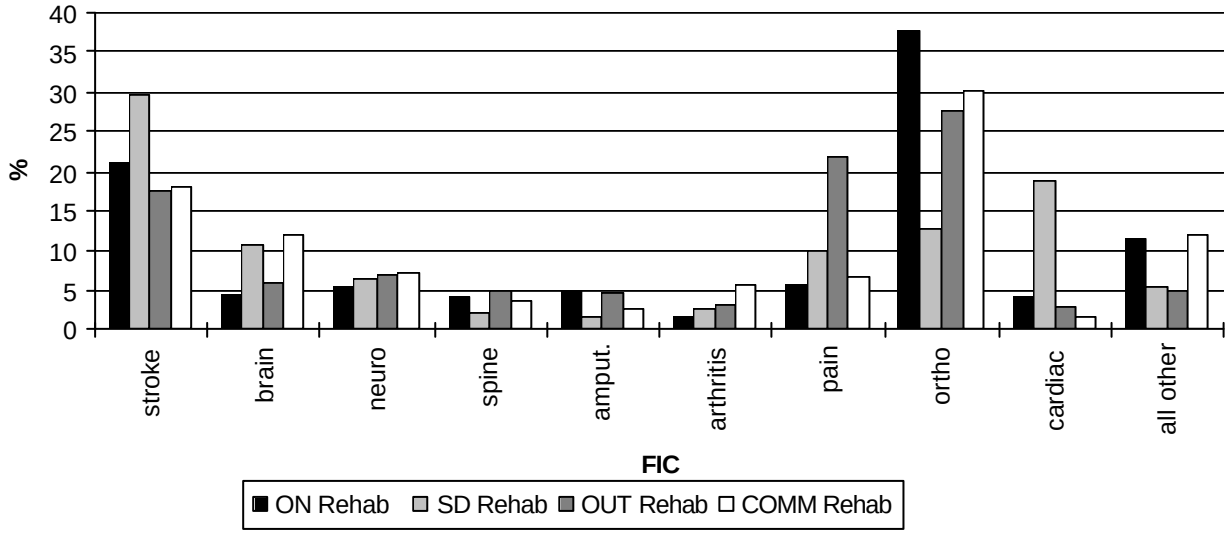
Figure 98 shows the scores for the Mini Mental State Examination (MMSE). The MMSE is not always an appropriate assessment and the study was designed so that, if the MMSE was not performed, the reason could be specified. There was such a high rate of non-completion of the MMSE across all Episode Types that the MMSE was discarded as a potential classification variable and no further analysis was undertaken.

Figure 98 MMSE - Rehabilitation

	Overnight		Same day		Outpatient		Community	
	no.	%	no.	%	no.	%	no.	%
Score 1-20	870	12.0	38	6.9	28	2.0	28	4.8
Score 21-30	3,607	49.8	210	38.4	636	45.1	329	55.8
Not undertaken - not fluent in English, speech disorder, impaired conscious state, not cooperative	683	9.4	61	11.2	148	10.5	93	15.8
Not undertaken - other reason	2,085	28.8	238	43.5	598	42.4	139	23.6

Figure 99 shows the impairment profile of rehabilitation episodes. The study required that staff use the Version 4.0 UDS Functional Impairment Codes (FIC) and select the code that best described why the person entered this episode. Staff were requested to code as specifically as possible and, if possible, to avoid use of FIC Group 13 'Other disabling impairments'. A list of the codes is included on the data collection forms in the Appendices.

Figure 99 Functional Impairment Codes - Rehabilitation



Sites participating in the SNAP study had the option of using either the Functional Independence Measure (FIM) or the Barthel Index and the RUG-ADL (see Section 2.2). The number and percentage of episodes with each measure is shown in Figure 100. The FIM was employed in 76% of all episodes and the Barthel Index in 24%. The overall percentages were consistent with those of the Geriatric Evaluation and Management episodes but there were some differences by episode type (see Section 5.4.4).

Figure 100 Usage of FIM and Barthel Index - Rehabilitation

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
FIM	5,747	79.1	332	60.6	989	70.2	343	58.1
Barthel	1,517	20.9	216	39.4	420	29.8	247	41.9

Summary data on the FIM and its two sub-scales are shown in Figure 101. As would be expected, the overnight episodes had the lowest functional status at episode start and achieved the highest amount of functional gain between episode start and episode end. Outpatients were at the opposite extreme. There were no differences between the profile of same day and community episodes.

Figure 101 FIM data - Rehabilitation

		Overnight	Same day	Outpatient	Community
FIM admission total Range: 18 - 126	mean	88	104	115	105
	median	93	111	126	114
FIM admission motor Range: 13 - 91	mean	59	74	82	75
	median	63	80	87	81
FIM admission cognition Range: 5 - 35	mean	29	30	33	30
	median	33	33	35	34
change in FIM total from start to end	mean	13	4	2	2
	median	11	0	0	0

Summary data on the Barthel Index are shown in Figure 102. As with the FIM episodes, the overnight episodes had the lowest functional status at episode start and achieved the highest amount of functional gain between episode start and episode end. Unlike the FIM data, the Barthel data shows some differences between the profile of same day and community episodes. The community episodes had lower functional status at episode start and achieved more functional gain between episode start and episode end than did the same day episodes. There were no differences between the profile of same day and outpatient episodes.

Figure 102 Barthel Index data - Rehabilitation

		Overnight	Same day	Outpatient	Community
Barthel admission	mean	64	92	92	87
	median	65	100	100	93
change in Barthel from start to end	mean	16	2	3	5
	median	15	0	0	0

Summary data on the RUG-ADL are shown in Figure 103. As with the FIM and the Barthel, the overnight episodes had the lowest functional status at episode start and achieved the highest amount of functional gain between episode start and episode end. There were no differences between the profile of same day, outpatient and community episodes.

Figure 103 RUG-ADL data - Rehabilitation

		Overnight	Same day	Outpatient	Community
RUG-ADL admission Range: 4 - 18	mean	8	5	5	5
	median	8	4	4	4
change in RUG-ADL from start to end	mean	-2.5	-0.3	-0.3	-0.2
	median	-1	0	0	0

Summary data on the RCI Behaviour scale are shown in Figure 104. These scores were re-coded to numeric values with a range of 3 to 12. A score of 3 indicated that the person required minimal or intervention for aggressive or disruptive behaviour. There were no differences on this item between the profile of overnight, same day, outpatient and community episodes.

Figure 104 RCI Behaviour scale data - Rehabilitation

	Overnight	Same day	Outpatient	Community
mean Range: 3 - 12	3.3	3.1	3.1	3.2
median	3	3	3	3

Figure 105 shows the reason for the end of the overnight episodes. 72% of episodes ended with the patient being discharged to home or to other accommodation. This was the highest of any of the five Case Types. The next most common reason was transfer to another hospital (8.6%) followed by discharge to a nursing home (6.6%). 7% of all overnight patients were still in care at the end of the study period.

Figure 105 Reason for Episode End - Overnight Rehabilitation

Reason	number	%
Discharged to a nursing home	482	6.6
Discharged to other accommodation	5,260	72.4
Died	81	1.1
Discharged/transferred to another hospital	626	8.6
Change to acute care and transfer to a different ward	74	1.0
Change to acute care whilst remaining on same ward	37	0.5
Change of Case Type within SNAP	125	1.7
Discharge own risk	48	0.7
Statistical discharge from leave	14	1.2
Still in care at end of study	508	7.0

Figure 106 shows why ambulatory episodes ended. Three quarters of the same day and nearly two thirds of the outpatient and community episodes ended with a case closure / discharge. 22% of the same day, 37% of the outpatient and 31% of the community clients were still in care at the end of the study.

Figure 106 Reason for Episode End - Ambulatory Rehabilitation

	Same day		Outpatient		Community	
	number	%	number	%	number	%
Discharge / case closure	395	72.1	848	60.1	379	64.2
Died	2	0.4	2	0.1	2	0.3
Admitted to hospital as overnight patient	15	2.7	29	2.1	16	2.7
Change to acute or primary care	6	1.1	5	0.4	5	0.8
Change of Case Type within SNAP	10	1.8	5	0.4	2	0.3
Change of episode type	0	0.0	1	0.1	2	0.3
Still in care at episode end	119	21.7	517	36.6	184	31.2

5.4.3 Psychogeriatric

This section summarises key descriptive statistics on the psychogeriatric episodes - overnight, same day, outpatient and community. It begins by showing summary statistics for each of the four episode types. This includes both assessment and treatment episodes and both complete and ongoing episodes (see Section 4.4.1).

Figure 107 shows summary statistics for the overnight episodes. Relative to the total overnight episode data set (see Section 5.3), psychogeriatric overnight episodes were $16 per day and $3,199 per episode more expensive than the average. With an average length of stay of 32 days during the study period, psychogeriatric episodes averaged 11 days more than the mean for all overnight episodes. Overnight psychogeriatric patients were 4 years older than the average overnight patient.

Figure 107 Selective Summary Statistics - Overnight Psychogeriatric

Variable	Mean	Standard Deviation
length of stay (total)	55.02	85.76
length of stay in study period	32.07	28.86
age	76.81	8.95
core cost per day	$268.57	$154.80
core cost per episode	$8,613.16	$8,799.33

As seen in Figure 108, patients having same day episodes were a little older than their overnight counterparts. They were seen on an average of 18 days each over the three months of data collection. They had a core average daily cost of $236, about 88% of the cost of an overnight episode. At $4,346 an episode, same day episodes were about half of the cost of an overnight episode and were well above that of most other Case Types. However, the number of same day episodes that did not straddle either the start or the end of the study was very small and therefore the results are not robust.

Figure 108 Selective Summary Statistics - Same Day Psychogeriatric

Variable	Mean	Standard Deviation
number of days seen in study period	18.40	20.50
age	78.40	5.50
core cost per day	$236.24	$112.85
core cost per episode	$4,346.80	$5,516.14

Outpatients (Figure 109) were the youngest group - on average, 4 years younger than same days. They were seen on an average of only 2 days each over the three months of data collection. With a core average daily cost of $38, they were about 16% of the cost of a same day patient and 14% the cost of an overnight patient. At $81 an episode, outpatient psychogeriatric episodes cost significantly less than any of the other Case Types. However, like same day episodes, the number of outpatient episodes that did not straddle either the start or the end of the study was very small and therefore the results are not robust.

Figure 109 Selective Summary Statistics - Outpatient Psychogeriatric

Variable	Mean	Standard Deviation
number of days seen in study period	2.14	1.99
age	74.54	9.59
core cost per day	$37.77	$67.75
core cost per episode	$80.83	$142.95

As seen in Figure 110, community clients had an average daily cost that was higher than outpatients. They were similar in age to same day patients and were seen on an average of 5 days during the three months collection period. With a core average daily cost of $50, they were about 19% of the cost of an overnight psychogeriatric patient. At $247 an episode, community episodes were about 3% the cost of an overnight episode.

Figure 110 Selective Summary Statistics - Community Psychogeriatric

Variable	Mean	Standard Deviation
number of days seen in study period	4.93	8.59
age	78.50	9.21
core cost per day	$50.04	$33.55
core cost per episode	$246.71	$516.81

The relationship between these variables was tested using a Pearson Correlation Coefficient. The results are shown in Figures 111 to 114. The level of statistical significance is shown in brackets.

The results for overnight psychogeriatrics are shown in Figure 111. The strongest correlation was between length of stay and core episode cost (0.67). This correlation was much weaker than any of the other Case Types. The correlation between age and episode cost was very small, but negative. This indicates that younger patients were slightly more costly than older patients. The difference is explained by differences in episode duration.

Figure 111 Pearson Correlation Coefficients - Overnight Psychogeriatric

	core cost per day	core cost per episode
length of stay (total)	-0.18882 (0.0015)	0.55155 (0.0001)
length of stay in study period	-0.18900 (0.0015)	0.67573 (0.0001)
age	-0.01589 (0.7908)	-0.17342 (0.0035)

For the same day episodes shown in Figure 112, the correlation between the number of days seen

and core episode cost was very strong - 0.91. However, this was probably influenced by the small sample size. No other correlation was significant.

Figure 112 Pearson Correlation Coefficients - Same Day Psychogeriatric

	core cost per day	core cost per episode
number of days seen in study period	0.23396 (0.7048)	0.91446 (0.0296)
age	-0.05859 (0.9254)	-0.65530 (0.2300)

The results for outpatients are shown in Figure 113. The correlation between the number of days seen and the core episode cost was, at 0.73, stronger than that of overnight episodes. Neither of the correlations involving age was significant (at a 5% level).

Figure 113 Pearson Correlation Coefficients - Outpatient Psychogeriatric

	core cost per day	core cost per episode
number of days seen in study period	-0.00203 (0.9867)	0.72467 (0.0001)
age	0.07032 (0.5629)	0.22228 (0.0644)

Figure 114 shows the results for community clients. At 0.92, the correlation between the number of days seen and core episode cost was very strong. Though the negative correlation between age and cost per episode was significant, it was very weak.

Figure 114 Pearson Correlation Coefficients - Community Psychogeriatric

	core cost per day	core cost per episode
number of days seen in study period	-0.00222 (0.9750)	0.91506 (0.0001)
age	-0.01147 (0.8713)	-0.23316 (0.0008)

The remainder of this section provides a descriptive overview of each of the Episode Types. This section includes all episodes, including those that straddled the start and end points of the study.

Figure 115 shows the number of ‘Assessment Only’ episodes. These were episodes in which the person was seen only for assessment or for a one-off treatment event and from which no further intervention was planned. No further information was collected about these episodes. As would be expected, the number of overnight ‘Assessment Only’ episodes was minimal. However, ‘Assessment Only’ represented nearly 26% of outpatient and 11% of community episodes.

Figure 115 Assessment Only Episodes - Psychogeriatric

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
yes	2	0.4	0	0	25	25.5	39	10.8
no	471	99.6	13	100	73	74.5	321	89.2

Figure 116 shows the reason for the start of overnight psychogeriatric episodes. The majority (61%) of episodes began as a direct admission from home. 20% began by a transfer from another hospital or from an acute care ward in the same hospital. Significantly, 15% of episodes began by a transfer from a nursing home. This was much greater than for any of the other Case Types.

Figure 116 Reason for Episode Start - Overnight Psychogeriatric

Reason	number	percentage
Admitted from a nursing home	70	14.9
Admitted from other accommodation/home	287	60.9
Transferred from another hospital	68	14.4
Transferred from acute care in another ward	26	5.5
Change from acute care to a SNAP Case Type whilst remaining on the same ward	5	1.1
Change of Case Type within SNAP	15	3.2
Statistical admission from leave	0	0.0

Figure 117 shows the reason for the start of the ambulatory psychogeriatric episodes. The majority of community episodes began by a direct contact following referral (including self-referral). In contrast, the majority of same day and outpatient episodes began as a result of transfer from inpatient hospital care. Community episodes were the only ambulatory episodes to begin with a change from primary or acute care.

Figure 117 Reason for Episode Start - Ambulatory Psychogeriatric

	Same day		Outpatient		Community	
	number	%	number	%	number	%
First contact following referral	8	30.8	15	20.5	239	74.5
Transferred from being an overnight patient	9	69.2	58	79.5	4	1.3
Change from primary or acute to SNAP	0	0.0	0	0.0	59	18.4
Change of Case Type within SNAP	0	0.0	0	0.0	8	2.5
Change of episode type	0	0.0	0	0.0	10	3.1

Figure 118 shows results for the variable ‘Sole Practitioner’. This item required participating staff to

record if the person received interventions from only one health care professional discipline and not from a multidisciplinary team who participated in the provision of assessment and/or treatment services. The definition of the Psychogeriatric Case Type specified multidisciplinary care as one of the criteria. Nevertheless, 14% of community clients and 8% of same day patients were identified as receiving Sole Practitioner psychogeriatric care. However, this result was below that for most other Case Types.

The definition of multidisciplinary assessment and/or management employed in the study is included in Appendix 4. This definition recognised that, in the ambulatory setting, multidisciplinary care could include direct care provided by only one health care provider if that health care provider had access to other disciplines for consultation, there was a multidisciplinary case conference, and there was a mechanism for ongoing multidisciplinary review.

Figure 118 Sole Practitioner - Ambulatory Psychogeriatric

	Same day		Outpatient		Community	
	number	percentage	number	percentage	number	percentage
yes	1	7.7	1	1.4	65	13.8
no	12	92.3	72	98.6	256	86.2

Figure 119 shows the results for the variable 'First Episode'. This item required participating staff to record (yes/no) if the episode was the person's first treatment for this condition. As would be expected, there was a difference between the overnight and the ambulatory episodes with only about one third of ambulatory psychogeriatric care being the person's first treatment program.

Figure 119 First Episode - Psychogeriatric

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
yes	260	55.2	4	30.8	28	38.4	96	29.9
no	211	44.8	9	69.2	45	61.6	225	70.1

Figure 120 shows the scores for the Mini Mental State Examination (MMSE). The MMSE is not always an appropriate assessment and the study was designed so that, if the MMSE was not performed, the reason could be specified. There was such a high rate of non-completion of the MMSE across all Episode Types that the MMSE was discarded as a potential classification variable and no further analysis was undertaken.

Figure 120 MMSE - Psychogeriatric

	Overnight		Same day		Outpatient		Community	
	no.	%	no.	%	no.	%	no.	%
Score 1-20	141	29.8	3	23.1	30	30.6	93	25.8
Score 21-30	91	19.2	1	7.7	13	13.3	169	46.9
Not undertaken - not fluent in English, speech disorder, impaired conscious state, not cooperative	154	32.6	7	53.9	9	9.2	41	11.4
Not undertaken - other reason	87	18.4	2	15.4	46	46.9	57	15.8

Figure 121 shows results for the variable 'phase'. Nearly 70% of overnight episodes were in the acute phase. The acute phase was defined as occurring when the patient has had a recent emergence of symptoms due to the exacerbation of ongoing mental illness or the onset of a new illness; and one or more of the following:

- requires **urgent assessment** and/or treatment; or
- the current condition is characterised by relatively **severe symptoms,** causing significant disruption in personal and/or social functioning; or
- there are reasonable grounds to believe that the patient presents a **risk** to self or others; and
- the primary **goal** is to achieve significant **improvement** in the short term by **reduction** in the frequency, intensity and/or range of positive **symptoms** of mental illness.

In contrast, patients undergoing community episodes were more evenly spread across the four phases. The largest percentage (38%) were in the monitoring and follow-up phase. This phase was defined as occurring when the patient has an ongoing mental illness which has **stabilised** and is not expected to show any further major improvement in the short to mid term and the primary **goal is to maintain** the patient's current level of functioning and prevent relapse.

Figure 121 - Psychogeriatric Phase

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
Acute	326	69.2	10	76.9	0	0.0	74	23.1
Rehab.	21	4.5	0	0.0	0	0.0	86	26.8
Consol.	87	18.5	3	23.1	0	0.0	39	12.2
Monitor	37	7.9	0	0.0	73	100.0	122	38.0

In addition to collecting data on diagnosis from hospital morbidity systems, a pick list of 10 diagnoses was used as a collectable item in the study. The results by Episode Type are shown in Figure 122. Over half of the overnight patients had a diagnosis of dementia and a further 20% had a diagnosis of an affective disorder (predominately depression). In contrast, the majority of ambulatory episodes had

a mood (affective) disorder.

Figure 122 - Psychogeriatric Episode Diagnosis

Diagnosis	Overnight	Same day	Outpatient	Community
Delirium	3.8%	7.7%	0.0%	2.3%
Dementia	55.6%	38.5%	12.3%	26.1%
Substance abuse	1.1%	0.0%	1.4%	1.9%
Other organic disorder	3.2%	0.0%	6.8%	0.8%
Schizophrenia/other non organic psychotic disorder	11.9%	23.1%	23.0%	22.6%
Mood (affective) disorder	20.4%	15.4%	53.4%	58.2%
Neurotic, stress related or somatoform disorder	2.1%	15.4%	0.0%	4.2%
Personality disorder	0.2%	0.0%	0.0%	3.8%
Other	1.7%	0.0%	0.0%	3.1%

Figure 123 shows results on the HoNOS scale. This 5 point scale was re-coded during the data preparation stage from its original scale (0 - 4) to new codes (1 - 5). This was undertaken to distinguish a score of 0 from a missing value. The instrument has 12 items. The maximum score on the original scale was 48 and the minimum score was 0. After re-coding, the maximum score was 60 and the minimum score was 12.

The HoNOS was undertaken two weeks after the start of each episode and, consistent with the standard rater instructions for the HoNOS, clinicians were required to score the most severe problem that had occurred over the last two weeks. The study differed from the standard HoNOS application in that it did not provide the option of recording a score of 'Not Known/Not Applicable'. Removing this option was based on a view that all of the information captured in the HoNOS would be known by clinicians. In consequence, the requirement to provide a complete HoNOS rating was not unreasonable. A major concern was that missing values would make the HoNOS data unusable.

The overnight episodes had the highest scores, indicating that these episodes had the most severe mental health problems. The overnight episodes also had the widest range of scores. The community episodes had the lowest scores but, like the overnight episodes, had a broad range. The smaller volume groups (same day and outpatients) had narrower ranges.

Figure 123 - Psychogeriatric HoNOS Total Scores

		Overnight	Same day	Outpatient	Community
Total Range: 12 - 60	mean	32.5	30.9	27.5	24.2
	median	32	31	27	24
	mode	30	28	19	18
	range	47	29	34	43

Summary data on the RUG-ADL are shown in Figure 124. The mean of 8 for overnight patients was equivalent to overnight Rehabilitation. It was lower than either the Geriatric Evaluation and Management or the Maintenance episodes indicating that, overall, Psychogeriatric episodes had better physical function than these other Case Types. Community Psychogeriatric episodes had lower physical function than Community Maintenance and better physical function than Community Geriatric Evaluation and Management episodes.

Figure 124 RUG-ADL data - Psychogeriatric

		Overnight	Same day	Outpatient	Community
RUG-ADL admission Range: 4 - 18	mean	8.0	5.8	4.7	5.8
	median	6.0	4.0	4.0	4.0

Summary data on the RCI Behaviour scale are shown in Figure 125. These scores were re-coded to numeric values with a range of 3 to 12. A score of 3 indicated that the person required minimal or no intervention for aggressive or disruptive behaviour.

Not surprisingly, the scores for all Episode Types were higher than those of the other Case Types that collected this variable (Rehabilitation, Geriatric Evaluation and Management and Maintenance). The scores for the same day patients are not reliable given the small volume of this group. The outpatient episodes had the best behaviour scores and the overnight episodes the worst.

Figure 125 RCI Behaviour scale data - Psychogeriatric

	Overnight	Same day	Outpatient	Community
mean Range: 3 - 12	5.8	6.4	3.5	4.0
median	5.0	5.0	3.0	3.0

Figure 126 shows the reason for the end of the overnight episodes. 36% of episodes ended with the patient being discharged to home or to other accommodation. The next most common reason was discharge to a nursing home (30.8%). This was equivalent to the Maintenance Case Type. 17% of all overnight patients were still in care at the end of the study period.

Figure 126 Reason for Episode End - Overnight Psychogeriatric

Reason	number	%
Discharged to a nursing home	145	30.8
Discharged to other accommodation	170	36.1
Died	13	2.8
Discharged/transferred to another hospital	30	6.4
Change to acute care and transfer to a different ward	1	0.2
Change to acute care whilst remaining on same ward	2	0.4
Change of Case Type within SNAP	25	5.3
Discharge own risk	3	0.6
Statistical discharge from leave	0	0.0
Still in care at end of study	82	17.4

Figure 127 shows why ambulatory episodes ended. 83% of the community clients were still in care at the end of the study whilst 9% ended with a case closure / discharge.

Figure 127 Reason for Episode End - Ambulatory Psychogeriatric

	Same day		Outpatient		Community	
	number	%	number	%	number	%
Discharge / case closure	6	46.2	0	0.0	30	9.3
Died	0	0.0	1	1.4	10	3.1
Admitted to hospital as overnight patient	1	7.7	4	5.5	13	4.0
Change to acute or primary care	0	0.0	0	0.0	1	0.3
Change of Case Type within SNAP	0	0.0	0	0.0	0	0.0
Change of episode type	0	0.0	1	1.4	1	0.3
Still in care at episode end	6	46.2	69	94.5	266	82.9

5.4.4 Geriatric Evaluation and Management

This section summarises key descriptive statistics on the Geriatric Evaluation and Management episodes - overnight, same day, outpatient and community. It begins by showing summary statistics for each of the four episode types. This includes both assessment and treatment episodes and both complete and ongoing episodes (see Section 4.4.1).

Figure 128 shows summary statistics for the overnight episodes. Relative to the total overnight episode data set (see Section 5.3), Geriatric Evaluation and Management overnight episodes cost $24 per day and $1,361 per episode less than the average. With an average length of stay of 17.7 days, Geriatric Evaluation and Management episodes were significantly shorter than other overnight episodes (21.4 days). Overnight Geriatric Evaluation and Management patients were also 8 years older than the average overnight patient.

Figure 128 Selective Summary Statistics - Overnight Geriatric Evaluation and Management

Variable	Mean	Standard Deviation
length of stay (total)	18.03	13.81
length of stay in study period	17.69	12.71
age	80.28	9.15
core cost per day	$229.11	$107.96
core cost per episode (incl. straddle episodes)	$4,053.01	$3,742.99

As seen in Figure 129, patients having same day episodes were, on average, 7 years younger than their overnight and community counterparts and 5 years younger than outpatients. They were seen on an average of 8 days each over the three months of data collection. They had a core average daily cost of $121, about 53% of the cost of an overnight episode. At $1,026 an episode, same day episodes were about 25% of the cost of an overnight episode.

Figure 129 Selective Summary Statistics - Same Day Geriatric Evaluation and Management

Variable	Mean	Standard Deviation
number of days seen in study period	8.48	10.90
age	73.28	14.66
core cost per day	$120.94	$139.21
core cost per episode (incl. straddle episodes)	$1,025.59	$1,689.13

Outpatients (Figure 130) were seen on an average of 3 days each over the three months of data collection. With a core average daily cost of $52, they were about 43% of the cost of a same day and 23% the cost of an overnight psychogeriatric patient. At $168 an episode, outpatient episodes were about 16% the cost of a same day episode and 4% the cost of an overnight episode.

Figure 130 Selective Summary Statistics - Outpatient Geriatric Evaluation and Management

Variable	Mean	Standard Deviation
number of days seen in study period	3.25	4.05
age	78.02	9.14
core cost per day	$51.79	$66.83
core cost per episode (incl. straddle episodes)	$168.32	$321.19

As seen in Figure 131, community clients had an average daily cost that was 33% higher than outpatients. They were similar in age to overnight patients and were seen on an average of 4 days during the three months collection period. With a core average daily cost of $64, they were about 53% of the cost of a same day patient and 28% of the cost of an overnight patient. At $244 an episode, community episodes were about 24% of the cost of a same day episode and 6% the cost of an overnight episode.

Figure 131 Selective Summary Statistics - Community Geriatric Evaluation and Management

Variable	Mean	Standard Deviation
number of days seen in study period	3.84	5.57
age	80.16	9.82
core cost per day	$63.60	$67.18
core cost per episode (incl. straddle episodes)	$244.22	$435.73

The relationship between these variables was tested using a Pearson Correlation Coefficient. The results are shown in Figures 132 to 135. The level of statistical significance is shown in brackets.

The results for overnight Geriatric Evaluation and Management are shown in Figure 132. The strongest correlation was between length of stay and core episode cost (0.85). This was stronger than the corresponding correlations for most of the other Case Types. There was no significant correlation between age and either daily cost or episode cost.

Figure 132 Pearson Correlation Coefficients - Overnight Geriatric Evaluation and Management

	core cost per day	core cost per episode
length of stay (total)	0.09603 (0.0006)	0.83496 (0.0001)

length of stay in study period	0.10339 (0.0002)	0.84740 (0.0001)
age	0.04072 (0.1470)	0.02345 (0.4038)

For the same day episodes shown in Figure 133, the correlation between the number of days seen and core episode cost was slightly less than that of the total same day data set and less than that of the overnights. There was a negative, but very weak, correlation between age and cost per episode. This suggests that older patients cost less on an episode basis. However, there was no significant correlation between age and per diem cost.

Figure 133 Pearson Correlation Coefficients - Same Day Geriatric Evaluation and Management

	core cost per day	core cost per episode
number of days seen in study period	-0.21708 (0.0038)	0.78165 (0.0001)
age	0.06057 (0.4246)	-0.27522 (0.0002)

The results for outpatients are shown in Figure 134. The correlation between the number of days seen and the core episode cost was, at 0.76, weaker than that of either overnight episodes or same day episodes.

Figure 134 Pearson Correlation Coefficients - Outpatient Geriatric Evaluation and Management

	core cost per day	core cost per episode
number of days seen in study period	0.02726 (0.5048)	0.76285 (0.0001)
age	-0.07475 (0.0671)	-0.03181 (0.4364)

Figure 135 shows the results for community clients. At 0.77, the correlation between the number of days seen and core episode cost was quite consistent with same day episodes. The correlations between age and both cost per day and cost per episode, though statistically significant, were negligible.

Figure 135 Pearson Correlation Coefficients - Community Geriatric Evaluation and Management

	core cost per day	core cost per episode
number of days seen in study period	-0.01842 (0.3772)	0.80520 (0.0001)

age	-0.06549 (0.0017)	-0.07914 (0.0001)

The remainder of this section provides a descriptive overview of each of the Episode Types. This section includes all episodes, including those that straddled the start and end points of the study.

Figure 136 shows the number of 'Assessment Only' episodes. These were episodes in which the person was seen only for assessment or for a one-off treatment event and from which no further intervention was planned. No further information was collected about these episodes. As would be expected, the number of overnight 'Assessment Only' episodes was very small. However, 'Assessment Only' represented a massive 89% of outpatient, 59% of community and 41% of same day episodes. A significant proportion of this assessment work was undertaken by Aged Care Assessment Teams (ACAT).

Figure 136 Assessment Only Episodes - Geriatric Evaluation and Management

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
yes	27	1.5	107	41.0	559	89.4	1,361	59.2
no	1,791	98.5	154	59.0	66	10.6	938	40.8

Figure 137 shows the reason for the start of overnight Geriatric Evaluation and Management episodes. Almost half began as a direct admission from home and a further 40% by a transfer from another hospital or from an acute care ward in the same hospital.

Figure 137 Reason for Episode Start - Overnight Geriatric Evaluation and Management

Reason	number	percentage
Admitted from a nursing home	115	6.4
Admitted from other accommodation/home	862	48.1
Transferred from another hospital	551	30.8
Transferred from acute care in another ward	159	8.9
Change from acute care to a SNAP Case Type whilst remaining on the same ward	66	3.7
Change of Case Type within SNAP	38	2.1
Statistical admission from leave	0	0.0

Figure 138 shows the reason for the start of the ambulatory Geriatric Evaluation and Management episodes. The majority of all episodes began by a direct contact following referral (including self-

referral). Very few of the ambulatory episodes began as a result of transfer from inpatient hospital care.

Figure 138 Reason for Episode Start - Ambulatory Geriatric Evaluation and Management

	Same day		Outpatient		Community	
	number	%	number	%	number	%
First contact following referral	129	83.8	62	93.9	864	92.1
Transferred from being an overnight patient	7	4.5	1	1.5	28	3.0
Change from primary or acute to SNAP	6	3.9	0	0.0	27	2.9
Change of Case Type within SNAP	4	2.6	0	0.0	16	1.7
Change of episode type	8	5.2	2	3.0	3	0.3

Figure 139 shows results for the variable 'Sole Practitioner'. This item required participating staff to record if the person received interventions from only one health care professional discipline and not from a multidisciplinary team who participated in the provision of assessment and/or treatment services. The definition of the Geriatric Evaluation and Management Case Type specified multidisciplinary care as one of the criteria. Nevertheless, 40% of community clients, 24% of outpatients and 32% of same day patients were identified as receiving Sole Practitioner Geriatric Evaluation and Management care.

The definition of multidisciplinary assessment and/or management employed in the study is included in Appendix 4. This definition recognised that, in the ambulatory setting, multidisciplinary care could include direct care provided by only one health care provider if that health care provider had access to other disciplines for consultation, there was a multidisciplinary case conference, and there was a mechanism for ongoing multidisciplinary review.

Figure 139 Sole Practitioner - Ambulatory Geriatric Evaluation and Management

	Same day		Outpatient		Community	
	number	percentage	number	percentage	number	percentage
yes	49	31.8	16	24.2	376	40.1
no	105	68.2	50	75.8	562	59.9

Figure 140 shows the scores for the Mini Mental State Examination (MMSE). The MMSE is not always an appropriate assessment and the study was designed so that, if the MMSE was not performed, the reason could be specified. Whilst the rate of non-completion was lower than for Rehabilitation, it was still too high to allow the MMSE to be considered as a potential classification variable and no further analysis was undertaken.

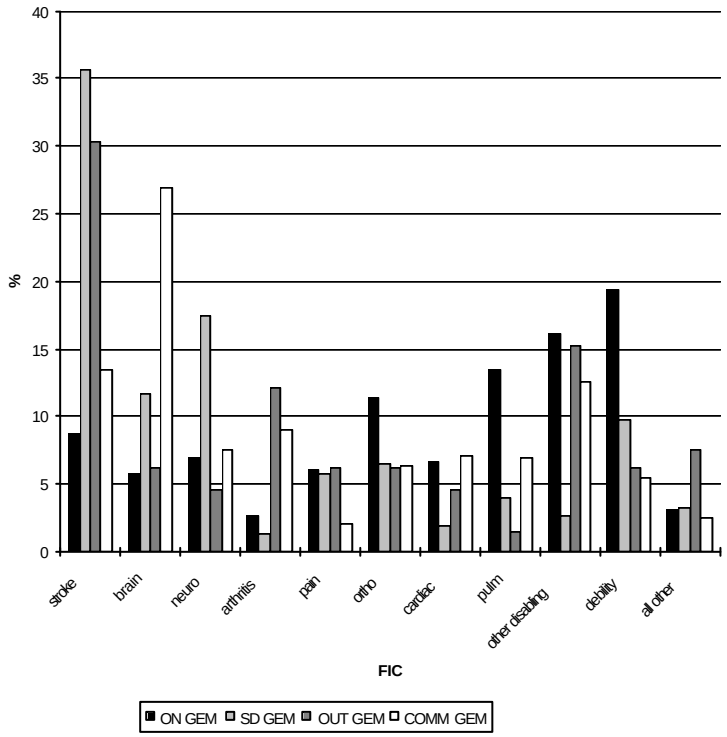
Figure 140 MMSE - Geriatric Evaluation and Management

	Overnight		Same day		Outpatient		Community	
	no.	%	no.	%	no.	%	no.	%
Score 1-20	418	23.7	14	9.2	7	10.8	117	12.8
Score 21-30	750	42.6	88	57.5	46	70.7	408	44.5
Not undertaken - not fluent in English, speech disorder, impaired conscious state, not cooperative	255	14.5	17	11.1	6	9.3	149	16.2
Not undertaken - other reason	339	19.2	34	22.2	6	9.3	243	26.5

Figure 141 shows the impairment profile of Geriatric Evaluation and Management episodes. The study required that staff use the Version 4.0 UDS Functional Impairment Codes (FIC) and select the code that best described why the person entered this episode. Staff were requested to code as specifically as possible and, if possible, to avoid use of FIC Group 13 'Other disabling impairments'. A list of the codes is included on the data collection forms in the Appendices. As discussed in Section 7.2, the overall profile is significantly different to that of Rehabilitation.

Figure 141 Functional Impairment Codes - Geriatric Evaluation and Management

Sites participating in the SNAP study had the option of using either the Functional Independence Measure (FIM) or the Barthel Index and the RUG-ADL (see Section 2.2). The number and percentage



of episodes with each measure is shown in Figure 142. The FIM was employed in 75% of all episodes and the Barthel Index in 25%. The overall percentages were consistent with those of the Rehabilitation episodes but there were some differences by episode type. In particular, there was significantly more usage of the FIM with the community GEM then with the community rehabilitation episodes and less usage of the FIM for overnight episodes.

Figure 142 Usage of FIM and Barthel Index - Geriatric Evaluation and Management

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
FIM	1,122	64.0	145	95.4	29	44.6	865	93.9
Barthel	630	36.0	7	4.6	36	55.4	56	6.1

Summary data on the FIM and its two sub-scales are shown in Figure 143. As with the rehabilitation episodes, the overnight GEM episodes had the lowest functional status at episode start and achieved the highest amount of functional gain between episode start and episode end. However, the overall functional status and the amount of functional gain was lower than for rehabilitation episodes. The profile of outpatient and community episodes was also different to rehabilitation and, again, the overall functional status and the amount of functional gain was lower than for rehabilitation episodes. Community GEM episodes had lower scores on all items than any of the other ambulatory rehabilitation or GEM episodes. When measured with the FIM, the functional status of the community GEM episodes declined slightly from episode start to episode end.

Figure 143 FIM data - Geriatric Evaluation and Management

		Overnight	Same day	Outpatient	Community
FIM admission total Range: 18-126	mean	83	103	103	98
	median	87	110	115	105
FIM admission motor Range: 13-91	mean	57	74	72	71
	median	60	81	80	78
FIM admission cognition Range: 5-35	mean	26	29	31	27
	median	29	32	34	30
change in FIM total from start to end	mean	6	2	-0.4	-0.9
	median	4	0	0	0

Summary data on the Barthel Index are shown in Figure 144. As with the FIM episodes, the overnight episodes had the lowest functional status at episode start and achieved the highest amount of functional gain between episode start and episode end. As before, the score for overnight GEM episodes was lower than for overnight rehabilitation episodes. There were only 7 same day episodes with a Barthel score making the data unreliable for analysis. Community GEM episodes again had lower scores on all items than any of the other ambulatory rehabilitation or GEM episodes (except the small same day group). However, when measured with the Barthel Index, the functional status of the community GEM episodes did not decline from episode start to episode end. This may be due to the difference in sample sizes between the FIM and Barthel community episodes.

Figure 144 Barthel Index data - Geriatric Evaluation and Management

		Overnight	Same day	Outpatient	Community
Barthel admission	mean	54	60	89	81
	median	56	75	94	90
change in Barthel from start to end	mean	10	6	3	0.2
	median	3	0	0	0

Summary data on the RUG-ADL are shown in Figure 145. As with the FIM and the Barthel, the overnight episodes had the lowest functional status at episode start and achieved the highest amount of functional gain between episode start and episode end. There were no significant differences between the profile of outpatient and community episodes.

Figure 145 RUG-ADL Data - Geriatric Evaluation and Management

		Overnight	Same day	Outpatient	Community
RUG-ADL admission Range: 4-18	mean	10	11	5	6
	median	10	11	4	4
change in RUG-ADL from start to end	mean	-1.5	-3.1	-0.1	0.1
	median	0	0	0	0

Summary data on the RCI Behaviour scale are shown in Figure 146. These scores were recorded to numeric values with a range of 3 to 12. A score of 3 indicated that the person required minimal or no intervention for aggressive or disruptive behaviour. There were some slight differences on this item between the profile of overnight, same day, outpatient and community episodes with the overnight and community episodes recording the highest scores.

Figure 146 RCI Behaviour scale data - Geriatric Evaluation and Management

	Overnight	Same day	Outpatient	Community
mean Range: 3-12	3.7	3.2	3.1	3.4
median	3	3	3	3

Figure 147 shows the reason for the end of the overnight episodes. 55% of episodes ended with the patient being discharged to home or to other accommodation. The next most common reason was discharge to a nursing home (6.6%) followed by transfer to another hospital (8.6%) and death of the patient (5.9%). 7% of all overnight patients were still in care at the end of the study period.

Figure 147 Reason for Episode End - Overnight Geriatric Evaluation and Management

Reason	number	percentage
Discharged to a nursing home	342	19.1
Discharged to other accommodation	983	54.9
Died	106	5.9
Discharged/transferred to another hospital	123	6.9
Change from a SNAP Case Type to acute care and transferred to a different ward	9	0.5
Change from a SNAP Case Type to acute care whilst remaining on the same ward	18	1.0
Change of Case Type within SNAP	84	4.7
Discharge own risk	10	0.6
Statistical discharge from leave	0	0.0
Still in care at end of study	109	6.1

Figure 148 shows why ambulatory episodes ended. 58% of the same day, 29% of the outpatient and 46% of the community episodes ended with a case closure / discharge. 29% of the same day, 56% of the outpatient and 44% of the community clients were still in care at the end of the study.

Figure 148 Reason for Episode End - Ambulatory Geriatric Evaluation and Management

	Same day		Outpatient		Community	
	number	%	number	%	number	%
Discharge / case closure	89	57.8	19	28.8	432	46.1
Died	4	2.6	0	0.0	32	3.4
Admitted to hospital as overnight patient	7	4.5	7	10.6	42	4.5
Change to acute or primary care	2	1.3	0	0.0	5	0.5
Change of Case Type within SNAP	4	2.6	2	3.0	13	1.4
Change of episode type	3	1.9	0	0.0	1	0.1
Still in care at episode end	45	29.2	37	56.1	413	44.0

5.4.5 Maintenance

This section summarises key descriptive statistics on the maintenance episodes - overnight, same day, outpatient and community. It begins by showing summary statistics for each of the four episode types. This includes both assessment and treatment episodes and both complete and ongoing episodes (see Section 4.4.1).

Figure 149 shows summary statistics for the overnight episodes. Relative to the total overnight episode data set (see Section 5.3), maintenance overnight episodes were $75 per day less expensive and $329 per episode more expensive than the average. This was due to the longer length of stay of Maintenance episodes (32 days compared to 21 days). Overnight maintenance patients were 2 years older than the average overnight patient.

Figure 149 Selective Summary Statistics - Overnight Maintenance

Variable	Mean	Standard Deviation
length of stay (total)	662.49	2329.69
length of stay in study period	32.25	33.06
age	73.94	15.89
core cost per day	$178.09	$98.53
core cost per episode	$5,743.43	$6,363.12

As seen in Figure 150, patients having same day episodes were the same age as their overnight counterparts. They were seen on an average of 6 days each over the three months of data collection. They had a core average daily cost of $132, about three quarters of the cost of an overnight episode. At $816 an episode, same day episodes were about 14% of the cost of an overnight episode.

Figure 150 Selective Summary Statistics - Same Day Maintenance

Variable	Mean	Standard Deviation
number of days seen in study period	6.18	8.43
age	73.37	18.55
core cost per day	$132.01	$84.27
core cost per episode	$815.80	$1,739.18

Outpatients (Figure 151) were the youngest group - on average, 18 years younger than same days and overnights. They were seen on an average of 4 days each over the three months of data collection. With a core average daily cost of $66, they were about half of the cost of a same day patient and 38% the cost of an overnight patient. At $292 an episode, outpatient episodes were about 36% of a same day episode and 5% the cost of an overnight episode.

Figure 151 Selective Summary Statistics - Outpatient Maintenance

Variable	Mean	Standard Deviation
number of days seen in study period	4.36	6.11
age	55.18	19.61
core cost per day	$66.91	$70.94
core cost per episode	$291.74	$676.69

As seen in Figure 152, community clients had an average daily cost that was a little lower than outpatients. They were 2 years younger than the average age of community clients across all five Case Types. Community maintenance clients were seen on an average of 12 days during the three months collection period. With a core average daily cost of $47, they cost about 26% of an overnight patient. At $550 an episode, community episodes cost about 10% of the cost of an overnight episode.

Figure 152 Selective Summary Statistics - Community Maintenance

Variable	Mean	Standard Deviation
number of days seen in study period	11.70	14.04
age	67.05	21.32
core cost per day	$47.04	$48.09
core cost per episode	$550.42	$832.74

The relationship between these variables was tested using a Pearson Correlation Coefficient. The results are shown in Figures 153 to 156. The level of statistical significance is shown in brackets.

The results for overnight maintenance are shown in Figure 153. The strongest correlation was between length of stay and core episode cost (0.77). The correlation between age and episode cost was negative but very weak.

Figure 153 Pearson Correlation Coefficients - Overnight Maintenance

	core cost per day	core cost per episode
length of stay (total)	-0.18114 (0.0001)	0.28763 (0.0001)
length of stay in study period	-0.20325 (0.0001)	0.76740 (0.0001)
age	0.03077 (0.3327)	-0.21137 (0.0001)

For the same day episodes shown in Figure 154, the correlation between the number of days seen and core episode cost was a little higher than that of the total same day data set (all Case Types) and higher than that of the overnight maintenance episodes. There was a very weak positive correlation between age and cost per day. This suggests that older patients cost more on a daily basis. However, there was no significant correlation between age and episode cost.

Figure 154 Pearson Correlation Coefficients - Same Day Maintenance

	core cost per day	core cost per episode
number of days seen in study period	0.27427 (0.0515)	0.82759 (0.0001)
age	0.35784 (0.0099)	0.09734 (0.4968)

The results for outpatients are shown in Figure 155. The correlation between the number of days seen and the core episode cost was, at 0.62, weaker than that of either overnight episodes or same day episodes. There was no significant correlation between age and cost.

Figure 155 Pearson Correlation Coefficients - Outpatient Maintenance

	core cost per day	core cost per episode
number of days seen in study period	0.07349 (0.0823)	0.62309 (0.0001)
age	-0.04080 (0.3352)	-0.0450 (0.2878)

Figure 156 shows the results for community clients. At 0.73, the correlation between the number of days seen and core episode cost was higher than that of the total community client data set (including all five Case Types). All other correlations were negligible.

Figure 156 Pearson Correlation Coefficients - Community Maintenance

	core cost per day	core cost per episode
number of days seen in study period	-0.11031 (0.0001)	0.73109 (0.0001)
age	-0.05391 (0.0010)	0.04767 (0.0036)

The remainder of this section provides a descriptive overview of each of the Episode Types. This section includes all episodes, including those that straddled the start and end points of the study.

Figure 157 shows the number of ‘Assessment Only’ episodes. These were episodes in which the person was seen only for assessment or for a one-off treatment event and from which no further intervention was planned. No further information was collected about these episodes. As would be expected, the number of overnight ‘Assessment Only’ episodes was negligible. However, ‘Assessment Only’ represented a massive 63% of outpatient episodes and 23% of same day episodes. ‘Assessment Only’ constituted 13% of community episodes.

Figure 157 Assessment Only Episodes - Maintenance

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
yes	10	0.7	15	22.7	498	62.7	900	13.2
no	1,522	99.3	51	77.3	296	37.3	5,935	86.8

Figure 158 shows the reason for the start of overnight maintenance episodes. Almost half began as a direct admission from home. About one third of episodes began by a transfer from another hospital or from an acute care ward in the same hospital.

Figure 158 Reason for Episode Start - Overnight Maintenance

Reason	number	percentage
Admitted from a nursing home	53	3.5
Admitted from other accommodation/home	690	45.3
Transferred from another hospital	333	21.9
Transferred from acute care in another ward	197	12.4
Change from acute care to a SNAP Case Type whilst remaining on the same ward	50	3.3
Change of Case Type within SNAP	198	13.0
Statistical admission from leave	1	0.1

Figure 159 shows the reason for the start of the ambulatory maintenance episodes. The majority of all episodes began by a direct contact following referral (including self-referral). 14% of community episodes began as a result of transfer from inpatient hospital care. More community episodes began with a change from primary or acute care than either same day or outpatient episodes.

Figure 159 Reason for Episode Start - Ambulatory Maintenance

	Same day		Outpatient		Community	
	number	%	number	%	number	%
First contact following referral	27	52.9	231	78.0	4,057	68.4
Transferred from being an overnight patient	1	1.9	17	5.7	806	13.6
Change from primary or acute to SNAP	4	7.8	20	6.8	968	16.3
Change of Case Type within SNAP	9	17.6	6	2.0	68	1.2
Change of episode type	10	19.6	22	7.4	36	0.6

Figure 160 shows results for the variable 'Sole Practitioner'. This item required participating staff to record if the person received interventions from only one health care professional discipline and not from a multidisciplinary team who participated in the provision of assessment and/or treatment services. The definition of the Maintenance Case Type was the only one that did not specify multidisciplinary care as one of the criteria.

Figure 160 Sole Practitioner - Ambulatory Maintenance

	Same day		Outpatient		Community	
	number	percentage	number	percentage	number	percentage
yes	26	51.0	98	33.1	2,383	40.2
no	25	49.0	198	66.9	3,549	59.8

Figure 161 shows the scores for the Mini Mental State Examination (MMSE). The MMSE is not always an appropriate assessment and the study was designed so that, if the MMSE was not performed, the reason could be specified. Over half of all episodes had no MMSE score. Given this result, the MMSE was discarded as a potential classification variable and no further analysis was undertaken.

Figure 161 MMSE - Maintenance

	Overnight		Same day		Outpatient		Community	
	no.	%	no.	%	no.	%	no.	%
Score 1-20	402	26.8	6	11.8	13	4.4	179	3.0
Score 21-30	325	21.7	23	45.1	149	50.5	1,199	20.3
Not undertaken - not fluent in English, speech disorder, impaired conscious state, not cooperative	417	27.8	7	13.7	38	12.9	890	15.0
Not undertaken - other reason	354	23.6	18	35.3	95	32.2	3,650	61.7

Figure 162 shows results for the variable 'Type of Maintenance Care'. The definition of Nursing Home Type (NHT) used in this study was that defined in the National Health Data Dictionary. This does not define a NHT episode as one in which the patient is awaiting nursing home placement. Instead, it defines a NHT patient as any admitted patient who has been in hospital for a continuous period exceeding 35 days and who does not have a current acute care certificate.

The majority (57%) of the overnight maintenance group were classified as Nursing Home Type. A further 29% were respite care and 6% were convalescent care. This item was one of the few in the collection where strict data edits were not built into *SNAPware* or *SNAPEdit* and, in consequence, 3% of the episodes were incorrectly classified as community maintenance care. These episodes were subsequently reclassified as 'Respite Care'. Likewise, 0.4% of community episodes were incorrectly classified as Nursing Home Type. It may be that the item was incorrectly interpreted to mean 'awaiting nursing home placement'. Not surprisingly, almost all community episodes were classified as 'community maintenance care'.

Figure 162 - Type of Maintenance Care

	Overnight		Same day		Outpatient		Community	
	number	%	number	%	number	%	number	%
Conv.	88	5.8	2	3.9	18	6.1	66	1.1
Respite	436	28.7	2	3.9	1	0.3	12	0.2
NHT	865	56.8	7	13.7	4	1.4	21	0.4
Comm.	43	2.8	38	74.5	230	77.8	5,827	98.2
Other	90	5.9	2	3.9	43	14.5	9	0.2

In addition to collecting data on diagnosis from hospital morbidity systems, a pick list of 10 diagnoses was used as a collectable item in the study. The results by Episode Type are shown in Figure 163. A quarter of the overnight patients had a diagnosis of dementia (compared to 50% for the Psychogeriatric episodes) and a further 18% had a diagnosis of CVA/Stroke. Nearly half of the ambulatory episodes were coded as 'Other'. This was an unexpected result given that the pick list employed in the study was that widely used by Aged Care Assessment Teams. Subsequent consultation with study sites has suggested that the 'Other' group included maintenance care for brain injury, for spinal injury and for clients who were generally frail but who did not have a specific diagnosis.

Figure 163 - Maintenance Episode Diagnosis

Diagnosis	Overnight	Same day	Outpatient	Community
Dementia	26.3%	9.8%	3.4%	5.8%
CVA/Stroke	17.7%	9.8%	27.7%	9.0%
Arthritis and related conditions	4.6%	13.7%	5.7%	8.7%
Heart disease	4.3%	5.9%	3.4%	8.7%
Fracture	4.6%	3.9%	3.0%	1.3%
Respiratory disease	5.0%	1.9%	1.0%	6.2%
Parkinson's disease/other CNS	6.7%	35.3%	11.8%	4.3%
Cancer	1.8%	0.0%	1.7%	6.2%
Psychiatric disorder	1.8%	1.9%	2.7%	0.9%
Other	27.4%	17.6%	39.5%	48.9%

Summary data on the RUG-ADL are shown in Figure 164. As with the other Case Types, the overnight episodes had the lowest functional status at episode start. The mean of 11.2 indicates that the overnight maintenance patients had lower functional status than any of the other Case Types except Palliative Care. Of the ambulatory episodes, the community episodes had the highest functional status.

Figure 164 RUG-ADL data - Maintenance

		Overnight	Same day	Outpatient	Community
RUG-ADL admission Range: 4-18	mean	11.2	6.3	5.6	5.5
	median	11.0	4.0	4.0	4.0

Summary data on the RCI Behaviour scale are shown in Figure 165. These scores were re-coded to numeric values with a range of 3 to 12. A score of 3 indicated that the person required minimal or intervention for aggressive or disruptive behaviour. There were no differences on this item between the ambulatory episodes. The overnight episodes had more behaviour problems than the ambulatory episodes.

Figure 165 RCI Behaviour scale data - Maintenance

	Overnight	Same day	Outpatient	Community
mean Range: 3-12	4.0	3.3	3.2	3.2
median	3.0	3.0	3.0	3.0

Figure 166 shows the reason for the end of the overnight episodes. 35% of episodes ended with the patient being discharged to home or to other accommodation. The next most common reason was discharge to a nursing home (31%) followed by transfer to another hospital (6%). 20% of all overnight patients were still in care at the end of the study period.

Figure 166 Reason for Episode End - Overnight Maintenance

Reason	number	%
Discharged to a nursing home	465	30.6
Discharged to other accommodation	531	34.9
Died	83	5.5
Discharged/transferred to another hospital	86	5.7
Change to acute care and transfer to a different ward	8	0.5
Change to acute care whilst remaining on same ward	14	0.9
Change of Case Type within SNAP	26	1.7
Discharge own risk	1	0.1
Statistical discharge from leave	0	0.0
Still in care at end of study	308	20.2

Figure 167 shows why ambulatory episodes ended. 65% of the community clients were still in care at the end of the study whilst 25% ended with a case closure / discharge. The pattern was similar for outpatients.

Figure 167 Reason for Episode End - Ambulatory Maintenance

	Same day		Outpatient		Community	
	number	%	number	%	number	%
Discharge / case closure	40	78.4	102	34.5	1,507	25.4
Died	0	0.0	3	1.0	151	2.5
Admitted to hospital as overnight patient	4	7.8	16	5.4	345	5.8
Change to acute or primary care	0	0.0	1	0.3	21	0.4
Change of Case Type within SNAP	0	0.0	1	0.3	26	0.4
Change of episode type	0	0.0	1	0.3	5	0.1
Still in care at episode end	7	13.7	172	58.1	3,880	65.4

5.5 Regression Tree analysis

Section 5.1 gave a brief overview of the statistical methods employed during the analysis. This section outlines the development of the classification, the options considered and the variance explained by each option.

5.5.1 Design rules

Four design rules were adopted for use during the analysis. The dependent variables used were the cost of a day of care, the cost of a palliative care phase and the cost of an episode of care. The independent variables were those characteristics of patients that can be measured and that can be demonstrated to be predictive of cost.

The four design rules used to guide classification development were:

1 Patient related cost drivers

The cost drivers used in the design of the classification should, wherever possible, be related to patient characteristics and not to the type, or extent, of services utilised.

2 Variance reduction

The selection of the cost drivers should result in minimum variation within each class and maximum variation across classes.

3 Sensible clinical groups

The final classes should be clinically sensible.

4 Ease of collection

The variables used in the classification should be capable of routine collection, coding and data entry.

5.5.2 Method

Exploratory class finding was undertaken using both CART and PC Group (see Section 5.1 above). During this exploratory stage, all single variables were tested and two preliminary classifications were developed - an episode classification and a per diem classification. Both the descriptive data and the preliminary classes were then reviewed by the Clinical Panel in order to ensure that the findings were clinically meaningful and to ensure that the final development of the classification was guided by clinical judgement.

A critical issue at this stage was to determine whether the use of the Geriatric Evaluation and Management Case Type could be supported by the data. After review, the Clinical Panel resolved that GEM should be a separate Case Type. This issue is discussed further in Section 7.2. A further issue was to determine whether the team should proceed to develop a per diem classification, a per episode classification, or both. The exploratory analysis had indicated that both a per diem and a per episode classification were possible. However, the preliminary analysis also indicated that the best statistical results for the episode classification would be achieved using a different assignment logic and, in some instances, different variables, to that of the per diem classification.

The Clinical Panel felt that one classification should be developed for use on either an episode or a

per diem basis. There should not be an episode classification and a separate per diem classification. Instead, one classification should be developed using episode cost as the dependent variable. An average daily cost, as well as the episode cost, should then be calculated for each class. It was recognised that, when used on a per diem basis, the classification may not perform as well as one specifically designed for per diem classification.

With the exception of Palliative Care, a set of independent variables had been captured for each episode. These variables would be tested using episode cost as the dependent variable. The independent variables for Palliative Care had been captured for each Palliative Care phase. They included the Type of Phase, RUG-ADL at phase start and phase end, and the Palliative Care Severity Score for each phase. These variables would be tested using phase cost and not episode cost as the dependent variable. A phase of Palliative Care was the equivalent of an episode of Rehabilitation, Psychogeriatric Care, Geriatric Evaluation and Management, and Maintenance Care.

One important implication of the decision to develop a classification using episode cost as the dependent variable was that incomplete episodes that straddled either the start or end of the study period (but not both) would need to be removed prior to further analysis (see Section 4.4.1). All of these episodes were incomplete and either the patient had been in care prior to the study or they were still in care at the end of the study. These partial episodes could not be included in the analysis because none of them had a full episode cost. Rather, they had a cost only for that part of the episode that fell within the study period.

It was recognised from the outset that partial episodes would not be able to be used in the episode analysis. They had been included in the study so that they could be costed. This was necessary for the accurate costing of the remaining episodes. They were also included in the study so that, in the event that an episode classification was not possible, they could be included in the analysis of per diem costs.

In total, 33.4% of the overnight episodes and 37.8% of the ambulatory episodes were incomplete. The initial business care for the study had estimated that 25% of episodes would be incomplete and would need to be disregarded for the purposes of episode analysis.

This was not the approach taken with respect to ongoing episodes (see Section 4.4.1). Ongoing episodes would be included in the analysis and would be allocated a length of stay of three months. Again, this was consistent with the initial study methodology and business case.

Following clinical review, the data set was split into two - an overnight data set and an ambulatory data set. Detailed work was then undertaken on each separate branch.

The overnight rehabilitation branch was split into a test sample and a re-test sample. Two thirds of the episodes were randomly assigned to the test sample and one third to the re-test sample. The overnight rehabilitation classification would be developed on the test sample and then validated on the re-test sample.

Because of the smaller volumes in the other branches, they were not split into test and re-test samples. To do so would have resulted in both sample groups being too small to test the study hypotheses and to produce results which would have been reliable.

The combination of trimming the ‘starting’ and ‘ending’ episodes and splitting the data base into a test sample and a re-test sample created difficulties even in overnight rehabilitation. The initial sample for overnight rehabilitation was 7,303 episodes. The final test sample was 3,738 and the re-test sample was only 1,569 episodes. These sample sizes were too small to use for testing the FIM-FRG classification, which had been one of the purposes of the study. In consequence, the FIM-FRG classification was tested on the full sample of 4,707 episodes that did not straddle the start or end points of the study.

In summary, the method used to develop the classification was the same as that to develop the AN-DRG classification and other classifications. It involved the development of a set of clinical hypotheses by the Clinical Panel and then an interative process of statistical testing and clinical review. Use was made of the test and re-test methodology but only in the branch with sufficient volume to allow it to be used - overnight rehabilitation. Again this was no different to the method used to develop the AN-DRG classification where no test and re-test could be undertaken in the low volume groups.

The final stage involved the trimming of each class by the removal of outlier episodes. Reduction in variance for the full tree was then re-calculated using only the trimmed data.

5.6 Regression tree analysis - overnight episodes

This section outlines the data preparation and the design of each branch within the overnight classification. As discussed in Section 4.3.3, class finding was undertaken using only Core Costs. In consequence, only Core Costs are reported in the figures in this section.

The recommended classification structure for each branch is discussed. These recommended structures are then combined in Section 6 to form the first version of the AN-SNAP overnight episode classification.

5.6.1 Overnight palliative care

Data Preparation
The analysis of the overnight palliative care sample began by removing all incomplete phases from the data set. These incomplete phases had straddled either the start or the end of the study period (see Section 4.4.1). There were 669 partial episodes and they represented 17.3% of the overnight palliative care sample.

An analysis of phase cost identified a small subset of phases with extremely high or extremely low costs. There were 13 “ongoing” phases in which the patient had been in one phase for a period greater than 92 days. All had been reviewed and their extremely high costs were known to be correct. They were not a homogenous group although most had a high RUG-ADL score. These phases were different from each other with respect to age, phase, and severity score, and came from 6 different sites.

There were 46 other phases that were also significantly higher than other phases (phase cost greater than $10,000). As with the 13 “ongoing” phases, these high cost phases were not a homogenous group. There were also 34 low cost phases (phase cost less than $150). Again, they were not a homogenous group.

These high cost and low cost phases were removed as outliers. In total, 93 phases were removed (2.9% of all phases) and the mean cost per phase fell from $1,861 to $1,611 (13.4%). The remaining 3,099 phases were then used in the analysis.

The Bereavement Phase was allocated a “length of stay” of one day regardless of the actual number of days seen . Length of stay is a meaningless concept for bereavement care. If this had not been done, all non-contact days within the Bereavement Phase would have needed to be recorded as “leave days”.

Classification Design
All single variables were tested to identify those variables that had most potential in an episode/phase classification. The independent variables for Palliative Care had been captured for each Palliative Care phase. They included the Type of Phase, RUG-ADL at phase start and phase end, and the Palliative Care Severity Score for each phase. These variables would be tested using phase cost and not episode cost as the dependent variable. A phase of Palliative Care was the equivalent of an episode of Rehabilitation, Psychogeriatric Care, Geriatric Evaluation and Management, and Maintenance Care.

All previous studies had used per diem cost as the dependent variable and had developed per diem classifications. For the reasons discussed in Section 5.5.2, this was not the approach taken in this analysis.

The single best variable in terms of prediction was Type of Phase. The RUG-ADL at phase start, the RUG-ADL at phase end, and age were also good predictors of cost. The Palliative Care Severity Score was not a good predictor. The initial model developed for clinical review included certain classes within the Stable and Unstable phases that were split based on phase end RUG-ADL score. A phase end RUG-ADL score was not recorded for patients who had died and these were grouped together within each phase.

The use of the RUG-ADL discharge score was not supported by the Clinical Panel and there was concern about grouping together all patients with a missing value. A new classification structure was preferred that made specific provision for patients in the Stable, Unstable and Deteriorating phases who had a RUG-ADL admission score of 18. The new classification structure would not make use of the RUG-ADL discharge score.

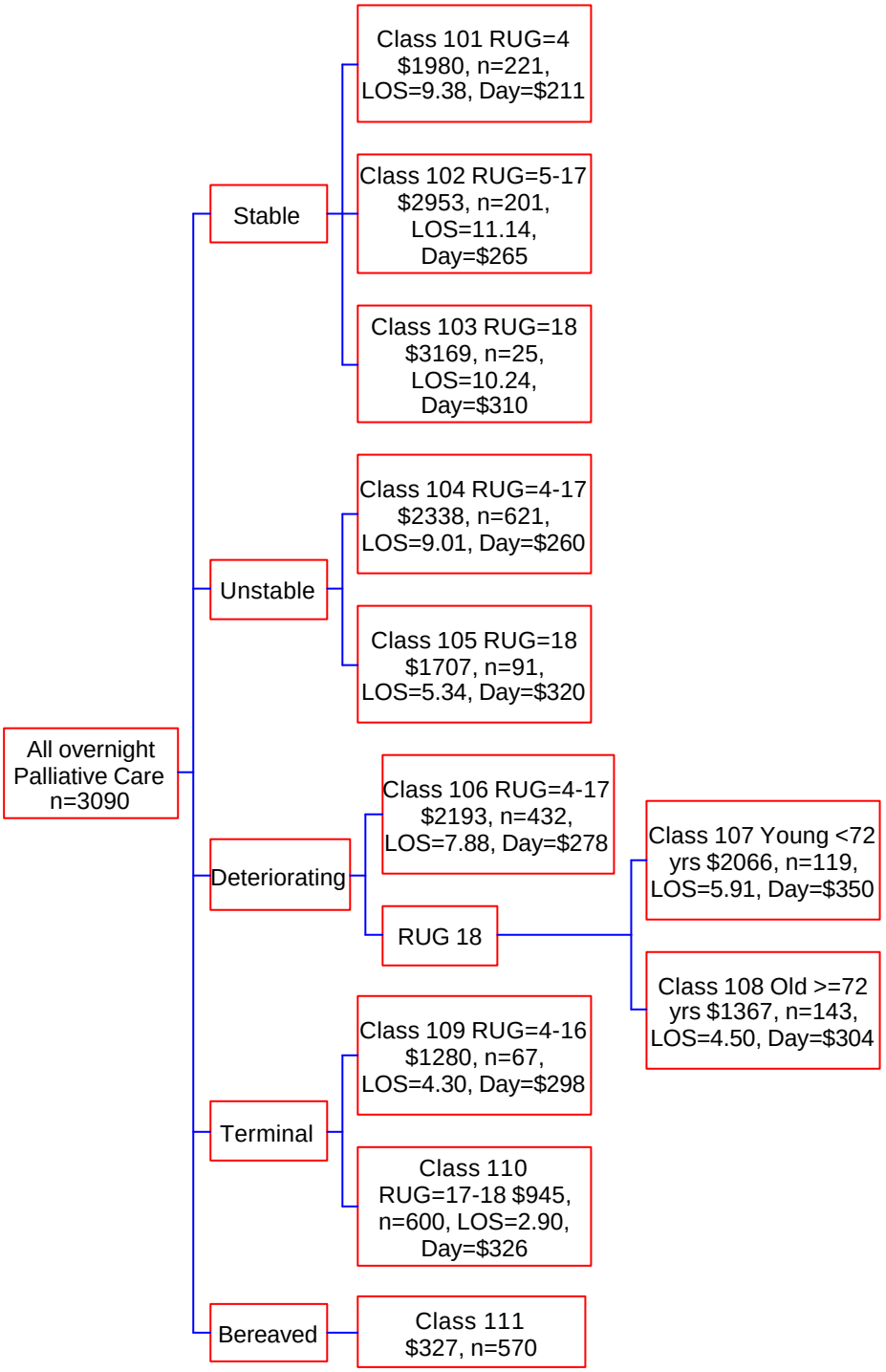
A second model was developed as the outcome of the clinical review. Patients with a RUG-ADL admission score of 18 in the Stable, Unstable and Deteriorating phases were grouped together with all other scores being split on Type of Phase. However, Type of Phase also proved to be the best single variable for splitting the RUG-ADL = 18 group. It made no difference if the first split was based on Type of Phase or RUG-ADL of 18 as the outcome was the same - either way there would be a group consisting of patients in the Stable phase with a RUG-ADL of 18. The result was the same for the Unstable and Deteriorating groups.

The recommended classification is included as Figure 168. The Bereaved Phase forms its own class. Each of the other four phases is split based on the RUG-ADL admission score. As before, further variance reduction was possible by the incorporation of further splits based on the RUG-ADL discharge score. However, as already noted, this approach was not pursued. The Deteriorating Group with a RUG-ADL of 18 is further split based on age. The ‘young’ group (age #72 years) included a number of very young patients and the results suggest that younger patients and their carers/family may be receiving more psychosocial counselling and support services than people in the older group. The young group is slightly more costly on a per diem basis than the high cost Terminal class.

The classification has 11 final classes and achieves 20.01% variance reduction using data that had not undergone the final trim. This is considered to be satisfactory given that the dependent variable was phase cost, and not per diem, cost. As a further refinement, the data in each class were trimmed using the interquartile range method outlined in section 5.1. This resulted in the trimming of a further 8 phases and a final reduction in variation of 20.98%. Details shown in Figure 168 relate to this trimmed data set. 7 of the 11 classes have a coefficient of variation of less than 1, and 4 have a coefficient of variation just over 1. The lower cost Terminal class has the highest coefficient of variation (1.26) indicating that there is considerable variability within the class.

The implications of this model of palliative care classification are discussed in Section 7.5.1.

Figure 168 - Overnight Palliative Care - Recommended Model



5.6.2 Overnight rehabilitation

Data Preparation

The analysis of the overnight rehabilitation sample began by removing all incomplete episodes from the data set. These incomplete episodes had straddled either the start or the end of the study period (see Section 4.4.1). There were 2,598 partial episodes and they represented 36% of the overnight rehabilitation sample. All complete and ongoing episodes (n=4,707) were used in the analysis.

As discussed in Section 3.1, a small number of specialist brain injury and spine injury units sites had collected data for an extended period. The purpose was to increase the number of 'complete episodes'. Not all services had been able to participate in the extended collection - some had collected data for 12 weeks, some for 16 weeks and some for a total of 24 weeks. As anticipated, the sites with the longer collection periods had significantly more 'complete' episodes than those with shorter collection periods. A further benefit was that, for the purposes of costing full episodes, the extension of the collection period for the spinal and brain injury units meant that these low volume but high cost episodes could be costed on a daily basis over an extended period. This would allow for a detailed analysis of the daily patterns of care over the course of an episode.

However, for the purposes of class finding, it was necessary to use only three months of costs of the long episodes in the extended collection sites so that the dependent variable would be consistent across all participating sites. Once the classes were established, it would then be necessary to re-calibrate the costs of the 'ongoing' episodes.

The next step in the preparation of the overnight rehabilitation data consisted of a review of the data to ensure that the mapping from the Barthel Index to the FIM Motor Sub-Scale had been accurate (see Section 4.5). The results indicate that the mapping process was satisfactory and are shown in Figure 169.

Figure 169 Results of Mapping the Barthel Index to the FIM Motor Sub-Scale

Variable	Data Set	Mean	S.D
FIM Motor score at admission	FIM data only	60.50	20.66
FIM Motor score at admission	FIM and mapped Barthel data	60.71	19.49
FIM Motor score at discharge	FIM data only	71.83	20.75
FIM Motor score at discharge	FIM and mapped Barthel data	71.89	19.52

The final step in the data preparation was to compare the impairment profile of the SNAP sample with that of the FIM-FRG data set. It was important to ensure that the over-sampling of brain and spinal injury would not distort the SNAP results relative to the FIM-FRG. The profile is shown in Figure 170. The concern proved unfounded as the FIM-FRG data base contained proportionally more brain and spinal injury episodes than the SNAP data set. The SNAP data set had more stroke and orthopaedic episodes.

Figure 170 SNAP Rehabilitation Data Set Compared to FIM-FRG Version 1 Data Set

	FIM-FRG *Number in Data Set = 36,980 Number used in analysis=15,155[2] (41%)*		**SNAP** *Number in Data Set = 7,305 Number used in analysis=4,669[3] (64%)*	
Impairment	**Number**	**%**	**Number**	**%**
Stroke	2,000	13.20	899	19.25
Brain - traumatic	1,103	7.28	157	3.36
Brain - non traumatic	666	4.39	56	1.20
Spine - traumatic	602	3.97	88	1.88
Spine - non traumatic	702	4.63	74	1.58
Neurological	1,260	8.31	251	5.38
Ortho - OR1	2,000	13.20	684	14.65
Ortho - OR2	1,880	12.41	617	13.21
Ortho - OR3	534	3.52	489	10.47
Amputation - AMI	913	6.02	170	3.64
Amputation - other	65	0.43	19	0.41
Arthritis - osteo	578	3.81	38	0.81
Arthritis - other	381	2.51	51	1.09
Cardiac	185	1.22	204	4.37
Pulmonary	263	1.74	124	2.66
Pain	662	4.37	312	6.68
Major Multiple Trauma	227	1.50	38	0.81
Other	1,134	7.48	398	8.52
TOTAL	**15,155**	**100.0**	**4,669**	**100.0**

1 After exclusion of cases not meeting stated eligibility criteria and after the trimming of outliers

2 After exclusion of partial episodes and with no trimming of outliers

Classification Design

Three classification models were developed for review by the Clinical Panel. The first was the FIM-FRG Version 1 classification. This was tested on the 4,669 episodes. It achieved a reduction in variance of 31.6%. The reported result for FIM-FRG Version 1 was 31.3%[28]. However, it has 53 classes and 23 of the classes had less than 30 cases in the SNAP database.

There were 39 'Assessment Only' episodes in the SNAP data set. They were included in the analysis of FIM-FRG but made no significant differences to the result (variance reduction of 0.45%).

The data set was then split into two with 67% of the episodes being randomly assigned to the learning sample and 33% to the test sample. The sample sizes for both the learning sample and the test sample were quite small - 3,113 in the learning sample, 1,557 in the test sample.

CART was used to create the most efficient classification possible. It was developed on the learning sample and then tested on the test sample. The result was a classification with only 10 classes. It achieved a variance reduction of 34.2%. Two classes (both high cost) had less than 50 cases. All of the classes had a coefficient of variation of less than 1 indicating that they were relatively homogeneous.

The models initially developed by the Clinical Panel were then tested on the full data set. By using as much data as were available, a more reliable attempt could be made to test the clinical hypotheses. The results of each option were then reviewed by the Clinical Panel.

The testing of FIM-FRG version 1 was regarded as satisfactory, but the number of classes in the FIM-FRG makes it impractical for application in Australia and New Zealand. The number of rehabilitation episodes is not sufficient to require a classification with 53 classes. The 10 part efficient model was also rejected. Although it performed well statistically, it lacked clinical meaning.

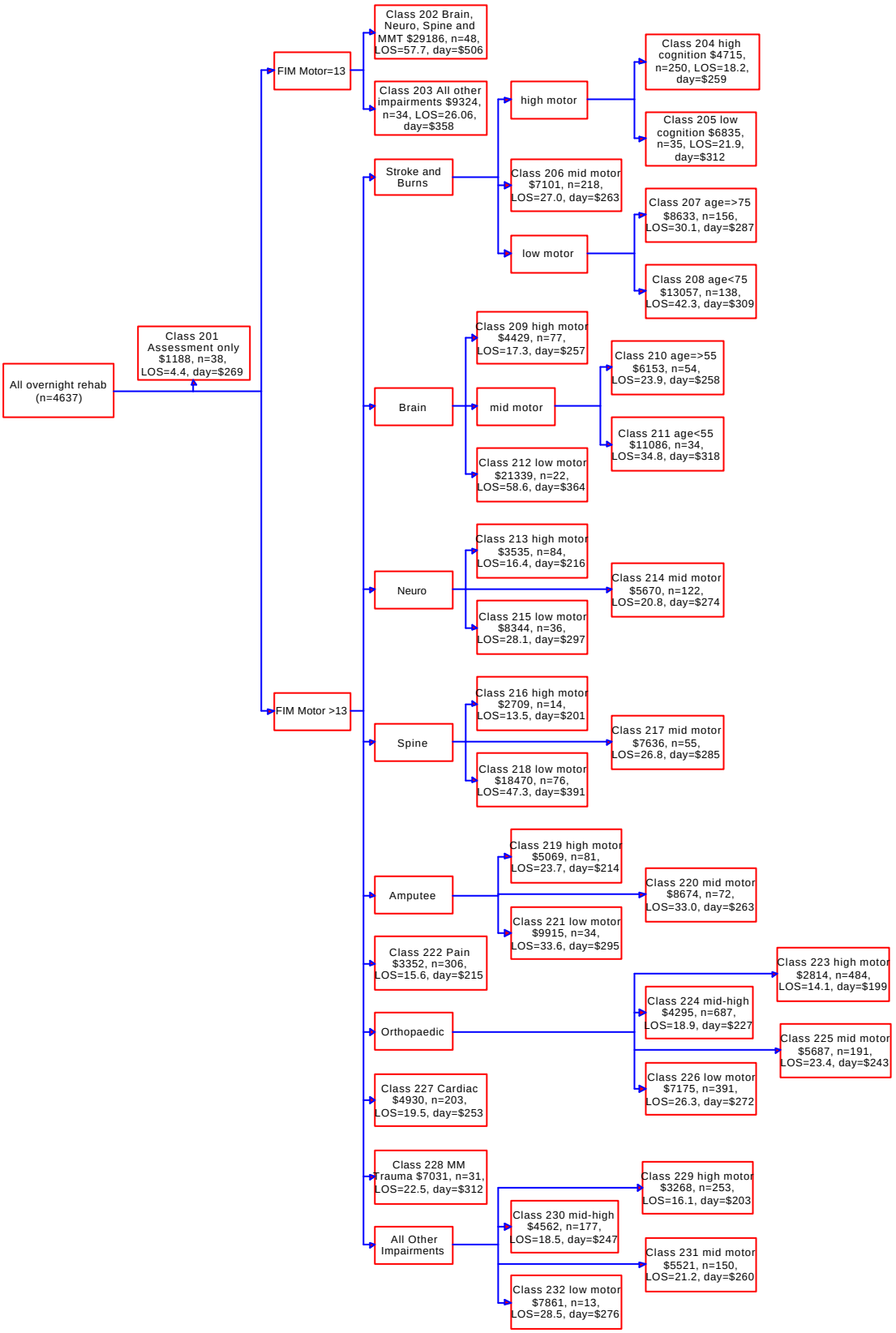
The recommended model meets both statistical and clinical criteria. It has 32 classes and achieves a variance reduction of 38.21% with trimmed data. Interquartile range trimming, as detailed in section 5.1, resulted in the exclusion of 70 episodes from 18 of the classes. Results obtained after this trim are shown diagrammatically in Figure 171. Further details of each class are included in the appendices.

Three impairment groups are terminating classes. Both the Pain Syndrome and the Cardiac Impairment groups had sufficient volume to be further split but variance explanation was not improved by doing so. Major Multiple Trauma had insufficient volume for a further split. On clinical advice, the small volume Burns Rehabilitation group were incorporated in with Stroke Rehabilitation. 6 impairment groups are incorporated together as "All Other Impairments". These impairment groups are Arthritis, Pulmonary, Congenital Deformities, Developmental Disabilities, Debility and Other Disabling Conditions.

Three of the 32 final classes are low volume classes. However, the episodes within each of these classes were sufficiently different from the other episodes to justify the creation of 3 low volume classes in the first version of the classification. Each of the classes is regarded as clinically sensible. All but three of the 32 classes have a coefficient of variation (CV) of less than 1 indicating that each of the classes is relatively homogeneous. One of these classes is the Assessment Only class. The other two classes are both low volume and have CVs of 1.00 and 1.02. 8 of the classes have over 200 episodes. The CVs for these 8 classes range from 0.57 to 0.81.

The implication of this model of rehabilitation classification are discussed in Section 7.5.2.

Figure 171 - Overnight Rehabilitation - Recommended Model



5.6.3 Overnight psychogeriatric care

Data Preparation

The analysis of the overnight psychogeriatric sample began by removing all incomplete episodes from the data set. These incomplete episodes had straddled either the start or the end of the study period (see Section 4.4.1). There were 192 partial episodes and they represented 41% of the overnight psychogeriatric sample. All complete and ongoing episodes (n=280) were used in the analysis.

An analysis of the patterns of care of the episodes identified that, like Maintenance, the Psychogeriatric Case Type contained 2 distinct sub-groups: short-term (complete) episodes and ongoing (LOS> 3 months) episodes. The short-term episodes had a mean core day cost of $302, the ongoing had a mean core day cost of $168. The 'ongoing group' comprised only 36 episodes or 13% of the total. The analysis also identified that there were 10 episodes that had extremely high costs ($25,000 plus an episode) and that were significantly different from the other episodes. All these episodes had been reviewed and were known to be correct. They were not a homogeneous group with respect to any of the key patient variables to be tested and, with such a small volume of data, they significantly influenced the mean costs for the group as a whole. After deliberation, these 10 episodes were removed as outliers. In doing so, the sample was reduced from 280 to 270 and the mean core episode cost reduced from $8,613 to $7,388.

Classification Design

All single variables were tested and, in addition, a new variable was created for testing based on HoNOS Severity. HoNOS Severity counted how many of the 12 HoNOS items had a score of 4 or 5. The single best variable was the RCI Behaviour Scale. It was recommended as the first split by both CART and PC-Group. The RUG-ADL, the HoNOS Total and some individual HoNOS items were also useful in explaining variations in cost. The HoNOS Severity score did not perform quite as well as the HoNOS Total. Neither 'phase' nor 'episode diagnosis' proved to be useful as a predictor of cost.

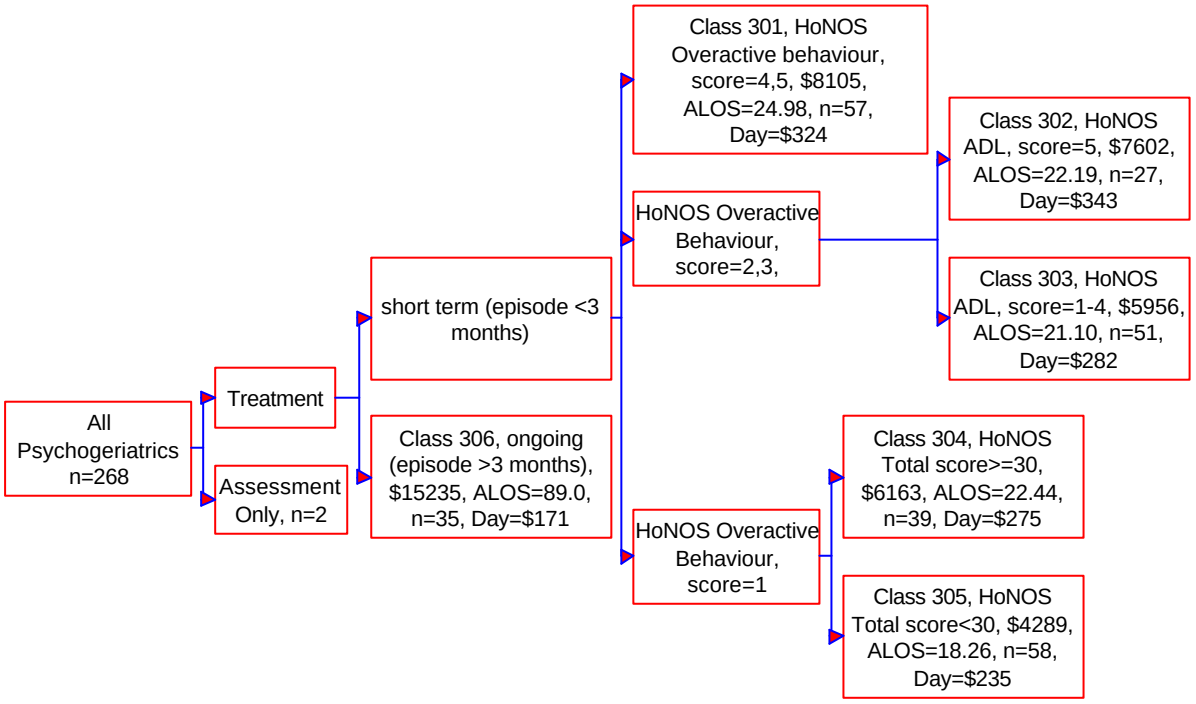
Three classification models were developed for review by the Clinical Panel. The first made no distinction between short-term and ongoing episodes. The second, which achieved the highest level of variance explanation, incorporated 3 measures - the RCI, the HoNOS and the RUG-ADL. The third substituted the HoNOS 'Overactivity' item for the RCI and the HoNOS 'ADL' item for the RUG-ADL. This third option allowed a classification to be created using just the HoNOS.

The recommended classification is included as Figure 172. In considering the various options, the Clinical Panel confirmed both that the long-term episodes were clinically quite distinct from the other episodes and that it was appropriate to identify this as a separate group. There was also support for the use of only one measurement instrument - the HoNOS - instead of the three that would be required if the classification required usage of the RCI Behaviour Scale, the RUG-ADL and the HoNOS.

The recommended classification has 6 final classes and achieves a reduction in variance of 36.40%. Only two more episodes were excluded after applying the interquartile trim detailed in Section 5.1. Details of each class after these two episodes were trimmed are printed in Figure 172. All of the classes are quite small and range from 27 to 58 cases. However, the episodes within each of the classes were sufficiently different from the other episodes to justify the creation of each of the classes. Each of the classes is regarded as clinically sensible. All classes have a coefficient of variation (CV) of less than 1 indicating that each of the classes is relatively homogeneous. The CVs range from 0.21 for Class 306 (the 'ongoing group') through to 0.89 for Class 305. The CVs for the other 4 classes range from 0.66 to 0.74.

The implication of this model of psychogeriatric care classification are discussed in Section 7.5.3.

Figure 172 Overnight Psychogeriatrics - Recommended Model



5.6.4 Overnight geriatric evaluation and management

The analysis of the overnight Geriatric Evaluation and Management sample began by removing all incomplete episodes from the data set. These incomplete episodes had straddled either the start or the end of the study period (see Section 4.4.1). There were 574 partial episodes and they represented 32% of the overnight Geriatric Evaluation and Management sample. All complete and ongoing episodes (n=1243) were used in the analysis.

As a group, the Geriatric Evaluation and Management episodes has a mean core episode cost of $4,123 with a standard deviation of $3,747 (CV=0.91). This coefficient of variation indicated that the Geriatric Evaluation and Management group was quite a homogeneus group. Because there was little variation within the group, there would not be very much variation to reduce.

Due to computer problems at one site, 31 episodes had a RUG-ADL score but no Barthel Index score. These episodes were excluded from the analysis of motor function.

Classification Design

All single variables were tested. Functional Impairment Codes, which had proved to be a good predictor of cost for the Rehabilitation episodes, explained only 2.3%. This was achieved by splitting the episodes into only 2 groups. Age, the RCI Behaviour Scale, Reason for Episode Start and Episode End explained very little.

There were 2 measures of cognitive function in the data set - the MMSE and the FIM Cognition sub-scale. Due to the rate of non-compliance, the MMSE was not able to be tested. However, cognitive function as measured by the FIM Cognition sub-scale proved to be a good predictor of costs for this group. Motor function, whether measured by the FIM Motor sub-scale, the Barthel Index or the combined measure that mapped the Barthel to FIM Motor, also proved to be predictive of costs.

Two models were developed for review by the Clinical Panel. In addition, the recommended model of rehabilitation classification was re-tested on this group. It explained less than 8% of the variation in costs and the volumes in almost all classes were very low.

One model was developed which excluded a measure of cognitive function. This model was developed because, without the MMSE, there was no measure of cognitive function for those episodes that had a Barthel Index score and not a FIM score (n=439). The best solution without incorporating a measure of cognitive function was a three part classification based solely on motor function. It explained 8.5% of the variance in cost.

Another model was developed which included cognitive function, motor function and age. This 7 part classification explained 11.4% of the variation in cost prior to trimming. Barthel episodes were excluded from the analysis of this model.

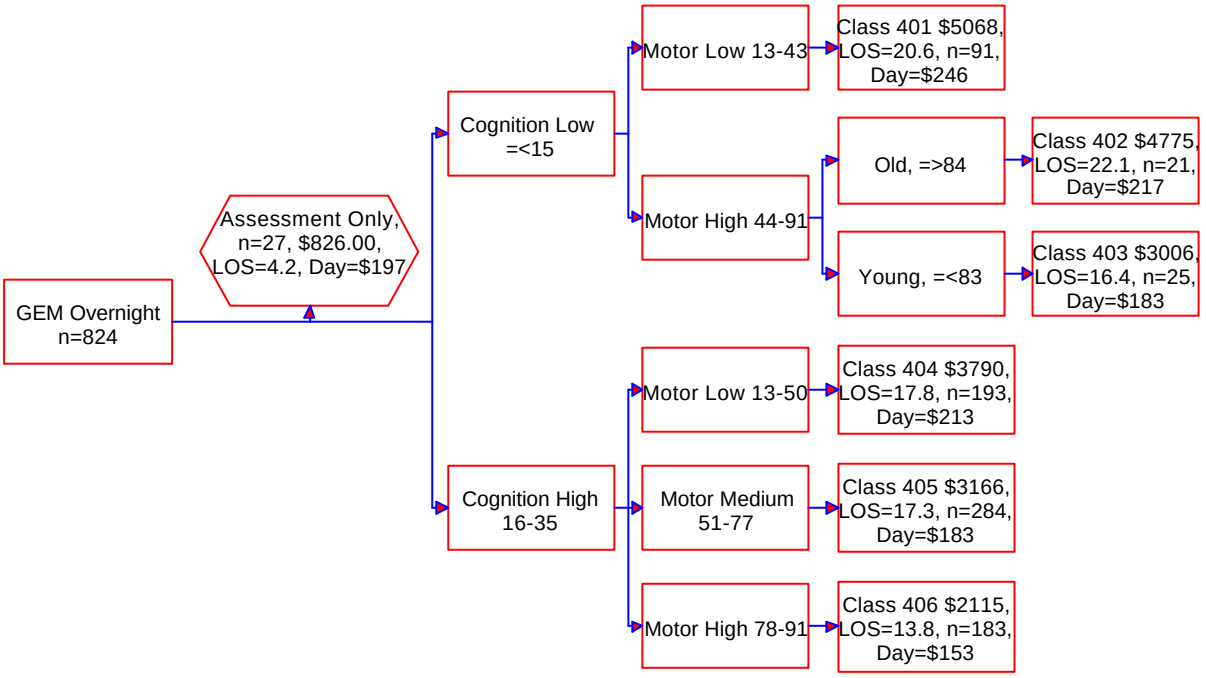
In considering the two options, the Clinical Panel confirmed the view of the Australian Society for Geriatric Medicine that cognitive function was a necessary attribute to be incorporated into a classification of Geriatric Evaluation and Management episodes. The Clinical Panel supported the model shown in Figure 173 and recommended that work proceed to investigate the feasibility of mapping other measures of cognition to the FIM Cognitive sub-scale.

After the classes were defined, the data were further trimmed using the interquartile range method outlined in Section 5.1. Nine episodes were trimmed from four classes. After trimming those 9 cases, the classification explained 9.97% of the variation of cost. The reduction in variance explanation which was achieved after trimming is because the trimming of these 9 outlier cases improved the homogeneity of the whole Case Type and reduced the heterogeneity between the groups. With less variation within the Case Type, these was even less variation to explain. Details for

each class using this trimmed data set are shown in Figure 173.

The percentage reduction in variance in the recommended option is the lowest of the 5 overnight Case Types. One reason is that the Geriatric Evaluation and Management Case Type is, in itself, a relatively homogeneous group. The statistical results verify that the Geriatric Evaluation and Management Case Type is a recognisable clinical entity. The overall assessment of the Geriatric Evaluation and Management Case Type is discussed in detail in Section 7.2 and the implications of the recommended classification of Geriatric Evaluation and Management episodes are discussed in Section 7.5.4.

Figure 173 - Overnight Geriatric Evaluation and Management - Recommended Model



5.6.5 Overnight maintenance care

Data Preparation

The analysis of the overnight Maintenance sample began by removing all incomplete episodes from the data set. These incomplete episodes had straddled either the start or the end of the study period (see Section 4.4.1). There were 540 partial episodes and they represented 35% of the overnight Maintenance sample. All complete and ongoing episodes (n=993) were used in the analysis.

An analysis of the patterns of care of the episodes identified that, like the Psychogeriatric episodes, the Maintenance Case Type contained 2 distinct sub-groups: short-term (complete) episodes and ongoing (LOS> 3 months) episodes. The short-term episodes had a mean core day cost of $227, the ongoing had a mean core day cost of $146. The long-term episodes represented 20% of all maintenance episodes.

Classification Design

6 episodes were "Assessment Only" episodes. No clinical data had been collected on 'Assessment Only' and so these 6 episodes were excluded from further analysis. All single variables were then tested on the remaining episodes. The best single variables were the RUG-ADL, Maintenance Type and Reason for Episode Start.

The Maintenance group were the only Case Type where a significant proportion of the episodes had started as a Case Type change from either acute care or from one of the other SNAP Case Types. It was important to understand the implications of a Type Change from, say, Rehabilitation to Maintenance as this would be important for funding system design. Reason for Episode Start proved to be an important variable. For the short term episodes, there were no differences in costs between those episodes that began at a change from acute care; those that began as a change from another SNAP Case Type and those that began as a direct admission from home. All had daily costs of around $220 and episode costs of around $3,400. Episodes that began as an admission from a nursing home or from another hospital were more costly, with per diem costs of $249 and episode costs of $5,200.

For the ongoing episodes, there were again no differences between episodes that began as a type change from acute care and those that began as a type change from one of the other Case Types. Both groups had day and episode costs of approximately $180 and $16,400 respectively. They were quite different from episodes that began as an admission from a nursing home or other hospital ($156 per day, $14,200 per episode) and those that began as a direct admission from home ($128 per day, $11,700 per episode).

The RUG-ADL proved to be a good predictor of costs for all groups. Diagnosis, age and the RCI Behaviour Scale explained very little.

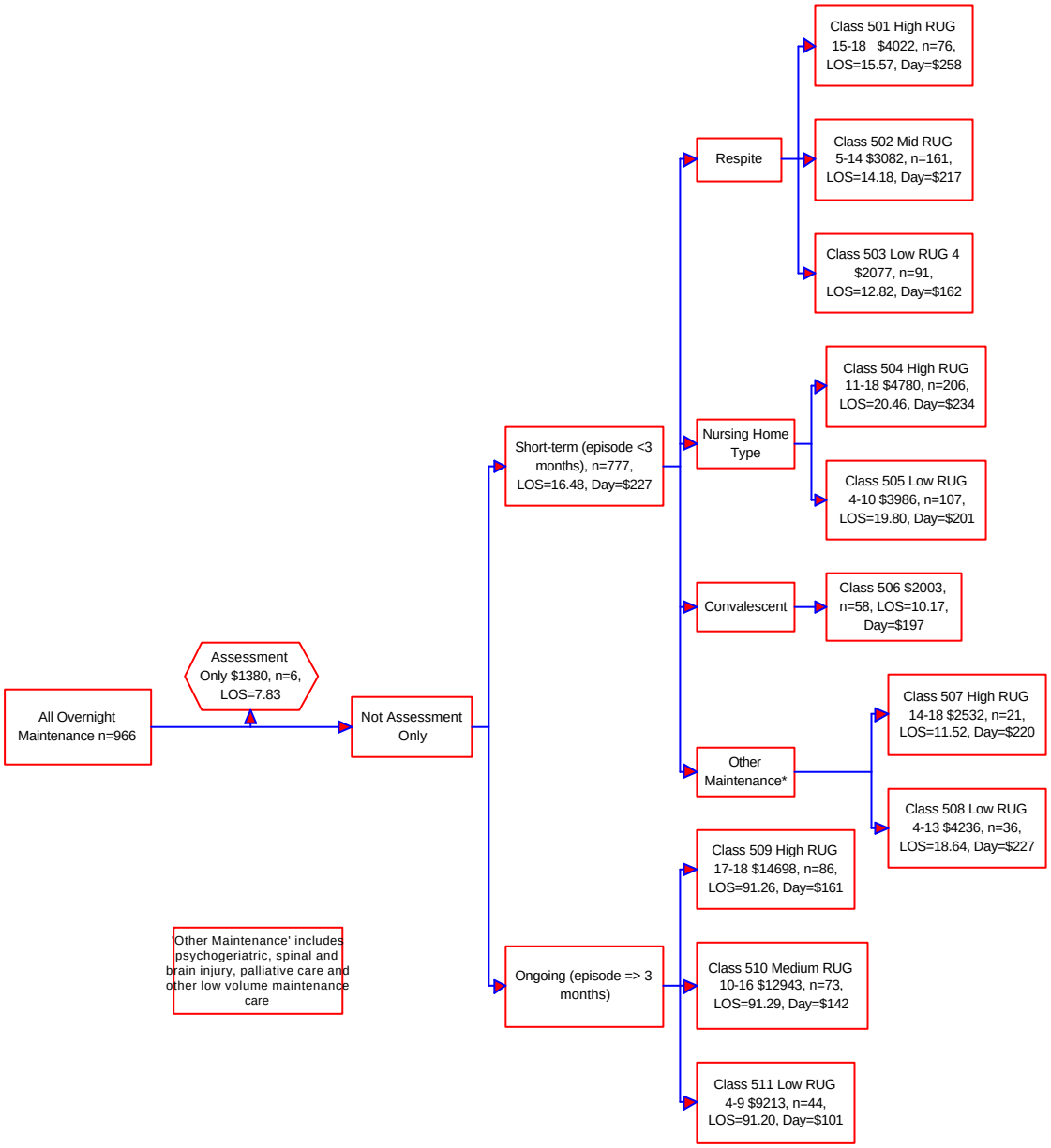
The variable 'Maintenance Type' was also a good predictor of costs. The majority of episodes were classified as Respite Care or Nursing Home Type. There were also some Convalescent Care and 60 short-term "Other Maintenance" episodes. These 'Other Maintenance' episodes proved to be of significantly higher cost. All but 18 were from 3 sites. These 3 sites all provided specialist rehabilitation or psychogeriatric care. These episodes will need to be defined based on the discharge data sets from these hospitals.

Two classification models were developed for review by the Clinical Panel. The first incorporated classes based on Reason for Episode Start. The second incorporated Type of Maintenance Care (Respite, Convalescent, Nursing Home Type and Other). Both models made use of the RUG-ADL.

In considering the two options, the Clinical Panel agreed that Reason for Episode Start should not be incorporated in the classification. The Panel was satisfied with the variables used in the alternate model, but not with the order in which the variables were assigned. In consequence, a final version of the classification was developed that incorporated the same variables in a more clinically meaningful structure.

The recommended classification is included as Figure 174. It has 11 final classes and achieves a reduction in variance of 42.99% on untrimmed data. This is slightly less than the two alternate models that were developed. These initial models had explained 45.0% and 43.1% of the variance of cost. However, the final classification is regarded as more clinically sensible. Cost details in Figure 174 relate to the data after 27 episodes were trimmed from 9 of the classes, using the interquartile trim described in Section 5.1. After trimming, the classification achieves a reduction in variance of 52.95%. There is one final class for short-term Convalescent Care. This class is the most heterogeneous (CV=1.47) and requires the use of a more rigorous definition of Convalescent Care. With the exception of 'Other Maintenance', each of the classes is regarded as clinically sensible. 'Other Maintenance' needs to be carefully defined before it could form a useful class for payment purposes. This may be possible with the use of hospital morbidity data. Alternately, it may require an approval process. This issue, and the implications of the overall classification of Maintenance Care, are discussed further in Section 7.5.5.

Figure 174 Overnight Maintenance - Recommended Model



5.7 Regression tree analysis - ambulatory episodes

This section outlines the data preparation and the design of each branch within the ambulatory classification. The recommended classification structure for each branch is discussed. These recommended structures are then combined in Section 6 to form the first version of the AN-SNAP ambulatory episode classification.

Data preparation

As discussed in Section 4.3.3, the initial study methodology had proposed that, as with the overnight episodes, all class finding would be undertaken using only Core Costs. Whilst this was the approach adopted for the overnight episodes, it was not the case for the ambulatory episodes. A review of the data during the preparation for class finding identified that the cost structure of outpatient episodes was significantly different to that of both the overnight episodes and the community episodes (see Figure 180). Specifically, the review suggested that medical time, and therefore medical cost, constituted a significant proportion of the total costs of outpatient care. Further, the proportions were not consistent across Case Types. For the Psychogeriatric and the Geriatric Evaluation and Management episodes, medical costs constituted more than 30% of the total episode cost.

Given this result, it was decided that Core Costs alone could not be used for class finding for the ambulatory episodes. To use Core Costs alone would distort the relativities between the three Episode Types as well as between the five Case Types. Instead, the sum of the Core Cost and the medical cost would need to be used for the purposes of class finding.

One limitation of this approach was that the quality of the medical time data varied from site to site. This had been anticipated in the design of the study and was one of the reasons why the initial decision had been made to exclude these costs for the purposes of class finding. Nevertheless, for ambulatory care, there was a greater risk of distorting the results by excluding medical costs rather than by including them.

The decision to include medical costs created a further problem. Sites had captured medical time, but had not necessarily captured medical costs because such costs were funded through other means. In particular, the medical costs of privately referred outpatients at most sites were met by the Health Insurance Commission (Medicare) and different arrangements were in place at some private sector sites. It was therefore necessary to use a standard costing for medical time.

A standard cost for medical services was derived from the costs reported by a subset of public sector sites. The subset consisted only of sites that had indicated in their site survey that they were ‘confident’ or ‘very confident’ about their medical data. On the basis of the data reported by these sites, medical costs for all sites were then calculated by applying a standard hourly rate of $52.90 per hour. This hourly rate was applied to the actual medical staff time reported by each site.

A further problem was highlighted during the ambulatory data preparation stage. Same day episodes were more costly than either community or outpatient episodes and it was likely that, at least in some branches, separate classes would be required for same day episodes. However, there were clear inconsistencies between and within sites in how same day episodes and outpatient episodes had been defined. It was apparent that, at least in some sites, the boundary between same day admitted episodes and outpatient episodes was very blurred.

It was therefore necessary to edit the data by applying a standard set of rules for the definition of an episode. There are no clinical criteria that define a same day or outpatient episode of sub-acute or non-acute care and, in consequence, it was necessary to define a set of rules based on episode cost.

The following rules were developed and applied:

- all episodes with a full episode cost of less than $20 were classified as outliers and excluded from analysis (n=233);
- all same day admitted episodes with a full episode cost of less than $100 were reclassified as outpatient episodes (n=64); and
- all outpatient episodes with an average daily cost of more than $300 were re-classified as same day episodes (n=24).

It was only after these processes were completed that work then proceeded on the development of the ambulatory classification.

5.7.1 Ambulatory palliative care

Data Preparation

The analysis of the ambulatory palliative care sample began by removing all incomplete phases from the data set. These incomplete phases had straddled either the start or the end of the study period (see Section 4.4.1). There were 1,324 partial episodes and they represented 36% of the ambulatory palliative care sample. The next step was to apply the standard cost for medical time and to apply the additional data edits as described in Section 5.7 above. 101 complete and ongoing phases (4.3%) were excluded as outliers in this process. This included the only 2 'assessment only' episodes. The remaining 2,246 phases were used for class finding.

A number of files had been created for use in the analysis (see Section 4.3.5). These included a new phase file for palliative care. The new phase file included all of the palliative care clinical data and two derived costing fields - the core cost for each phase and the average cost of each phase.
The decision to include medical costs (see Section 5.7) created a particular problem for palliative care because the new phase file included only summary costs and did not include medical costs. The detailed costs for palliative care (including medical costs) were included in the new episode file and had been assembled on an episode, and not a phase, basis.

This was not a problem for those episodes that consisted of only one phase. It was, however, a problem for those episodes that consisted of more than one phase. As shown in Figure 78, the mean number of phases per episode for community clients was 1.69. It was not possible in the time available to re-write all of the required computer programs in order to calculate the detailed costs of each phase. It was therefore decided to split the 12 service costs (see Section 4.3.3) of each episode in proportion to the number of contact days in each phase.

This process did not change the core cost of each phase or the average daily core cost of each phase. However, it may have acted to skew the relative distribution of the 12 service costs between the phases. If so, the total effect would not have been significant because of the low number of phases per episode (the majority of episodes had only one phase).

The required computer programs will need to be re-written for subsequent analysis of the same data. This will allow for any effect to be accurately measured. However, for the purposes of establishing the first version of the classification, the methodology employed was considered to be sufficiently accurate.

Classification Design

All single variables were tested to identify those that had most potential in the classification. Subject to satisfactory performance, those variables used to classify the overnight episodes would also be used to classify the ambulatory episodes. However, it was possible that variables not used to define the overnight classes would prove to be better predictors of cost for ambulatory care. As with the overnight episodes, it was agreed that it was not clinically sensible to employ the variables 'reason for episode start', 'reason for episode end' or the RUG-ADL score at phase end as splitting variables even if they explained variantion in cost.

There were 28 episodes where a significant proportion of the episode cost was in medical and surgical supplies. For these episodes, the cost of medical and surgical supplies was greater than $500. These episodes were significantly different to the other ambulatory episodes and were grouped together. However, a separate class for this group was not created as high cost medical and surgical supplies are best funded through other mechanisms.

An analysis was undertaken to assess practice variations between sites. It had been identified during

the initial study design and training period that a considerable proportion of community palliative care is provided on a 'shared-care' basis. Many community palliative care services have shared care arrangements with General Practitioners, Home and Community Care agencies, community nursing services and other providers. Whilst the study team and participating sites made considerable effort to ensure that 'shared care' providers also collected the required data, it was apparent from the site survey that this had not always been successful. As discussed in Section 3.6.1, only 21% of community palliative care services provided a 24 hour service. 68% of sites provided a service only during business hours and the remaining 11% provided an extended hours service. Of the 'business hours' sites, only 29% of their 'shared care providers' had actually participated in the collection. It was important to assess the degree to which this could confound any results.

By itself, the variable 'facility' explained only 11% of the variation in cost. This could suggest that the 'facility effect' was not overly significant. However, it could also be that any 'facility effect' was being masked by the significant variation that existed within each site.

A further analysis was therefore undertaken to assess whether 'provider type' was predictive of costs. Some participating sites provided a palliative care nursing service whilst others provided a more comprehensive multidisciplinary service. For some of the sites providing solely a nursing service, shared care from other disciplines was provided by other agencies. There were also variations within any single service. For example, one site may have provided medical care to some clients but shared the care of other clients with a General Practitioner.

Four groups were defined based on 'Provider Type'. In each case, the rule for defining the group was the same. A phase was assigned to the Nursing group if the care was provided by nurses and the total costs of all other disciplines during the course of the entire episode (and not just the phase) was less than $20 (n=1,268). A phase was assigned to the Medical group if the care was provided by doctors and the total costs of all other disciplines during the course of the entire episode (and not just the phase) was less than $20 (n=37). A phase was assigned to the Therapies group if the care was provided by physiotherapists, occupational therapists, speech pathologists, therapy aids, social workers, psychologists, aboriginal health workers or chaplains and the total costs of all other disciplines during the course of the entire episode (and not just the phase) was less than $20 (n=62). Finally, all other phases were assigned to a multidisciplinary care group (n=589). This 'multidisciplinary' group consisted of all patients for whom multidisciplinary care had been provided at some point during their episode of care (but not necessarily within that specific phase).

The best single variable for usefully explaining cost variations proved to be these four Provider Types. Provider Type was more predictive of cost than type of phase or any other clinical variable. Type of episode was not predictive of cost.

One class was established for the Medical Only group. This group consisted of only 37 phases. The remaining episodes were then split into 'Bereavement' or 'Not Bereavement'. All phases other than the bereavement phase were then split into the remaining three provider groups - nursing, therapies and multidisciplinary. There were 62 phases that were Therapies only. This group was too small for a further split and were left as a terminating class.

The best variable for explaining cost within both the multidisciplinary and nursing groups was type of phase. There were 178 Stable phases in the multidisciplinary group and 421 Stable phases in the nursing group. The multidisciplinary group was reasonably homogeneous (CV=0.98) and was not further split. The Stable nursing group consisted of nearly 20% of the whole ambulatory palliative care data set and was more than double the size of the multidisciplinary group. It was also more heterogeneous (CV=1.41). Within this group, the variable Palliative Care Severity Score was the most predictive of costs. This variable had not explained any of the variance in the overnight episodes. Two groups were established - one for phases with a severity score of 10 or less (n=336) and one for those with a severity score of 11 or more (n=85).

The high severity score group of 85 phases was reasonably heterogeneous (CV=1.30) and, although

a number of variables looked promising, there were no sensible binary splits. They were therefore left as one class.

The low severity group was split on the RUG-ADL. There were 276 phases with a RUG-ADL of 4 and these were then split again on age. Both groups were still relatively heterogeneous (coefficients of variance of 1.38 and 1.15) but none of the possible further splits were clinically acceptable. There were 60 phases with a RUG-ADL of more than 4. As before, this group were quite heterogeneous (CV=1.38) but there were no sensible binary splits.

For the two Unstable Phase groups, the RUG-ADL was the most predictive of costs. The best splits within the RUG-ADL classes differed between the nursing and multidisciplinary groups. The nursing group was split into a group with a RUG-ADL less than 14 and a group with a RUG-ADL more than 15. The high RUG-ADL group was too small for a further split (n=34). For the low RUG-ADL nursing group, the best split was age. In contrast, the best split for the low RUG-ADL multidisciplinary group was again the severity score.

A similar pattern was seen in the Deteriorating Phase groups. This time the best split in the nursing group was by use of the RUG-ADL whilst the best split for the multidisciplinary group was by use of the severity score. The multidisciplinary high severity group was then split again by the RUG-ADL.

The two Terminal groups were both diverse. The nursing Terminal group consisted of 176 phases and had a coefficient of variation of 1.27. The multidisciplinary Terminal group consisted of 80 phases and was more heterogeneous (CV=1.51). As before, no sensible binary splits were possible. Both groups were established as final classes.

There were 262 Bereavement phases and they were very diverse (CV=2.00). These phases were split based on age. The young group (age less than 44) were quite small (n=22) but were considerably more expensive than the older group - $502 compared to $159. Even after this split, both groups were still quite diverse, with coefficients of variance of 2.06 and 1.39 respectively. Some of this diversity can no doubt be attributed to variations in the bereavement services policies of the participating sites (see Section 3.6.1).

The resultant classification is shown in Figure 175. However, the costs quoted there have been calculated using data that were trimmed by the interquartile range method described in Section 5.1. A total of 16 phases were trimmed after the development of the ambulatory palliative care phases. There are 22 classes, which is considerably more than expected. The number of classes is the result of the decision to group by Provider Type so as to control for the confounding effect of factors such as shared care arrangements and other variations between providers. The classification explains 17.14% variation in phase cost using the trimmed data. This is the lowest of the 5 ambulatory Case Types. There are several possible reasons. The first is that the attempt to control for shared care arrangements and other provider variations was not particularly successful. This possibility was explored by testing the recommended classification using only the data from those sites known to provide a comprehensive service. The RIV within this subset was better than for the data set as a whole.

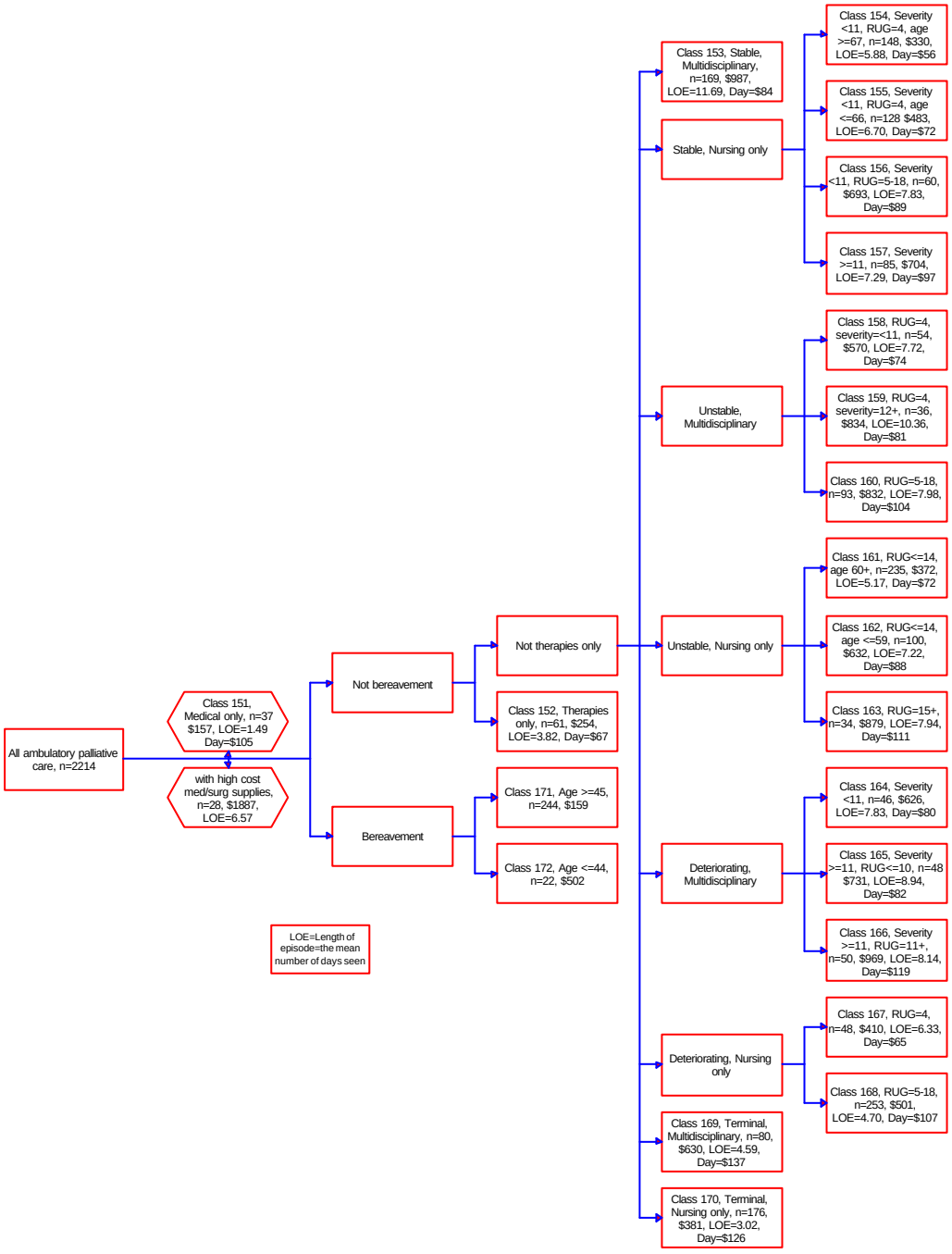
The second possibility is that the method of assigning costs between phases (see Data Preparation above) has acted to distort the costs of the Multidisciplinary group. It may be that some of these phases received only mono-disciplinary care.

A more likely reason is that ambulatory palliative care is best classified on a per diem basis rather than an episode basis. This view was supported by a preliminary analysis using the data from those sites known to have comprehensive services. For these sites, the variable Type of Phase explained 12.6%, the RUG-ADL explained 17.9% and Severity explained 10.4% of the variation in per diem costs. For the reasons outlined in Section 5.5.2, it had been agreed that one all-episode classification should be developed for use on either an episode or a per diem basis. This decision had been made whilst recognising that the resultant classification may not perform as well as one specifically

designed for per diem classification.

Further work is required before the next version of the classification in order to resolve these issues. In the interim, the palliative care ambulatory classification is not recommended for use in an episode payment model. The implications of this approach are discussed more fully in Section 7.6.

Figure 175 Ambulatory Palliative Care - Recommended Model



5.7.2 Ambulatory rehabilitation

Data Preparation

The analysis of the ambulatory rehabilitation sample began by removing all incomplete episodes from the data set. These incomplete episodes had straddled either the start or the end of the study period (see Section 4.4.1). There were 1,331 partial episodes and they represented 44% of the ambulatory rehabilitation sample. The next step was to apply the standard cost for medical time and to apply the additional data edits as described in Section 5.7 above. 65 complete and ongoing episodes (3.8%) were excluded as outliers in this process. The remaining 1,661 episodes were used for class finding.

As with the overnight episodes, a small number of specialist brain injury and spine injury sites had collected data for an extended period. Again, for the purposes of class finding, it was necessary to use a maximum of three months' of the costs of the long episodes in the extended collection sites so that the dependent variable would be consistent across all participating sites. Once the classes were established, it would then be necessary to re-calibrate the costs of the 'ongoing' episodes.

Classification Design

All single variables were tested to identify those that had most potential in the classification. Subject to satisfactory performance, those variables used to classify the overnight episodes would also be used to classify the ambulatory episodes. However, it was possible that variables not used to define the overnight classes would prove to be better predictors of cost for ambulatory care.

One important issue to resolve was whether the FIM and its two sub-scales could be incorporated into the classification. The FIM was originally designed for use in an inpatient setting. It was important to determine whether it was appropriate for routine application in an ambulatory setting. If not, it could not be incorporated into the classification.

The view of the Clinical Panel was that the FIM could be incorporated into the classification. The FIM is not a good measure of outcome in the ambulatory setting. However, it is a reasonable measure of functional status and the feedback from study sites had suggested that it could be administered on a routine basis. Given that the distinguishing feature of rehabilitation is its focus on functional status, it was appropriate to incorporate a measure of function. Further, given that the cost data had suggested that rehabilitation episodes were more costly than most other ambulatory care, it was reasonable to require a functional assessment if assignment to the Rehabilitation Case Type would result in a higher payment.

The variable 'Episode Type' was tested. Episodes classified as 'same day admitted' episodes were more costly than either 'Outpatient' or 'Community'. This was true both before and after the data editing processes. There were 16 same day 'Assessment Only' episodes. These episodes were highly variable in cost and, given their low volume, were excluded from further analysis.

There were no significant differences between the cost of 'Outpatient' and 'Community' episodes. These episodes may have somewhat different cost structures, in that outpatient episodes may have higher overhead costs and community episodes may have higher travel costs. However, the net effect was that the average cost was the same in both settings. They were therefore grouped together.

The single best predictor of cost was the type of impairment. Splits were also recommended by the use of the FIM Cognition Sub-Scale and the FIM Motor Sub-Scale. The total number of same day episodes (n=253) was not sufficient to allow more than one to be used. It was decided that, in this first version of the classification, the emphasis should be on establishing an appropriate classification structure.

Consistent with the approach adopted for the overnight episodes, it was decided that the initial classes should be based on type of impairment. This structure allows for further classes with splits based on function to be incorporated into subsequent versions of the classification.

Only 3 impairment groups were supported by the data. Brain dysfunction, major multiple trauma and pulmonary were grouped together to form one class. These episodes were the most expensive of the same day episodes but had slightly lower per diem costs. The difference was due to the number of days seen.

6 impairment codes were grouped together to form the second class - stroke, amputation, arthritis, orthopaedic, other disabling conditions and debility (n=136).

Burns, cardiac, pain syndromes, spinal dysfunction and neurological were grouped together to form the third class. These episodes were the least costly same day episodes because they were seen on fewer days than the other episodes.

Each of these 3 same day classes could be split in the future based on the FIM Motor Sub-Scale. If the number of episodes were larger, it would also be possible to separate out some impairment groups into their own classes. This approach was not pursued in this study because there were no significant differences in cost between the impairment codes that were grouped together to create each of the 3 classes.

The outpatient and community episodes had a different profile than the same day episodes. Most importantly, 30% of these episodes were for ‘Assessment Only’ (n=415). No clinical data had been collected on ‘Assessment Only’ episodes and so type of impairment could not be tested on this group. 20% of the ‘Assessment Only’ group had been seen only by a medical practitioner. They were grouped together to form one class. The multidisciplinary episodes were then grouped together to form another class.

This was also the case for the 951 treatment episodes but the number of ‘medical only’ episodes was much lower (n=26). As before, they were grouped together to form one class.

The remaining episodes were then split into 5 impairment groups. Only 2 of the classes had sufficient volume for further analysis.

One class was created for Amputation of Limb. The amputee group was the most expensive of any of the outpatient/community classes on both an episode and per diem basis. It was relatively homogeneous (CV=0.89). This was not the case for either the overnight or same day episodes.

There were two options with respect to the spinal episodes. The first was to make no special provision for them and to simply group them in with 10 other impairment codes that had similar cost. This approach gave the best statistical result.

The alternative, and the one adopted, was to separate the spinal episodes into their own class. This approach was regarded as being more clinically sensible. Unlike the same day episodes, there were sufficient episodes to create a class (n=44). However, they were quite variable as the coefficient of variation was 2.15, although this reduced to 1.2 after the interquartile range trim. The data suggested that this group should be further split based on the FIM Motor Sub-Scale but the volume was insufficient to do so.

A class was established for brain dysfunction and major multiple trauma. Like the spinal group, this class was also highly variable (CV=1.37) and low volume (n=87). However, it again made more clinical sense to create a separate class for these episodes.

For the 2 groups with sufficient volume for further analysis, the best predictor of cost was ‘Sole Practitioner’ followed by the FIM Motor Sub-Scale. The FIM Cognition Sub-Scale was also a possible

variable for these groups. The 'Sole Practitioner' classes contained episodes in which the patient had been seen solely by a nurse or allied health professional. Neither class had sufficient volume for a further split although the FIM Motor Sub-Scale was again the most predictive of costs within these groups.

The best predictor of costs within the multidisciplinary groups was again the FIM Motor Sub-Scale. The cost results were quite different for each of the two classes.

One class contains predominately stoke rehabilitation although development disability has also been included. There were only 3 developmental disability episodes and their pattern of cost was similar to the higher volume stroke group (n=137). For this group, episodes with a low FIM score had a lower episode cost than episodes with a high FIM score. There were no significant differences on a per diem basis. The difference was simply in the number of days seen.

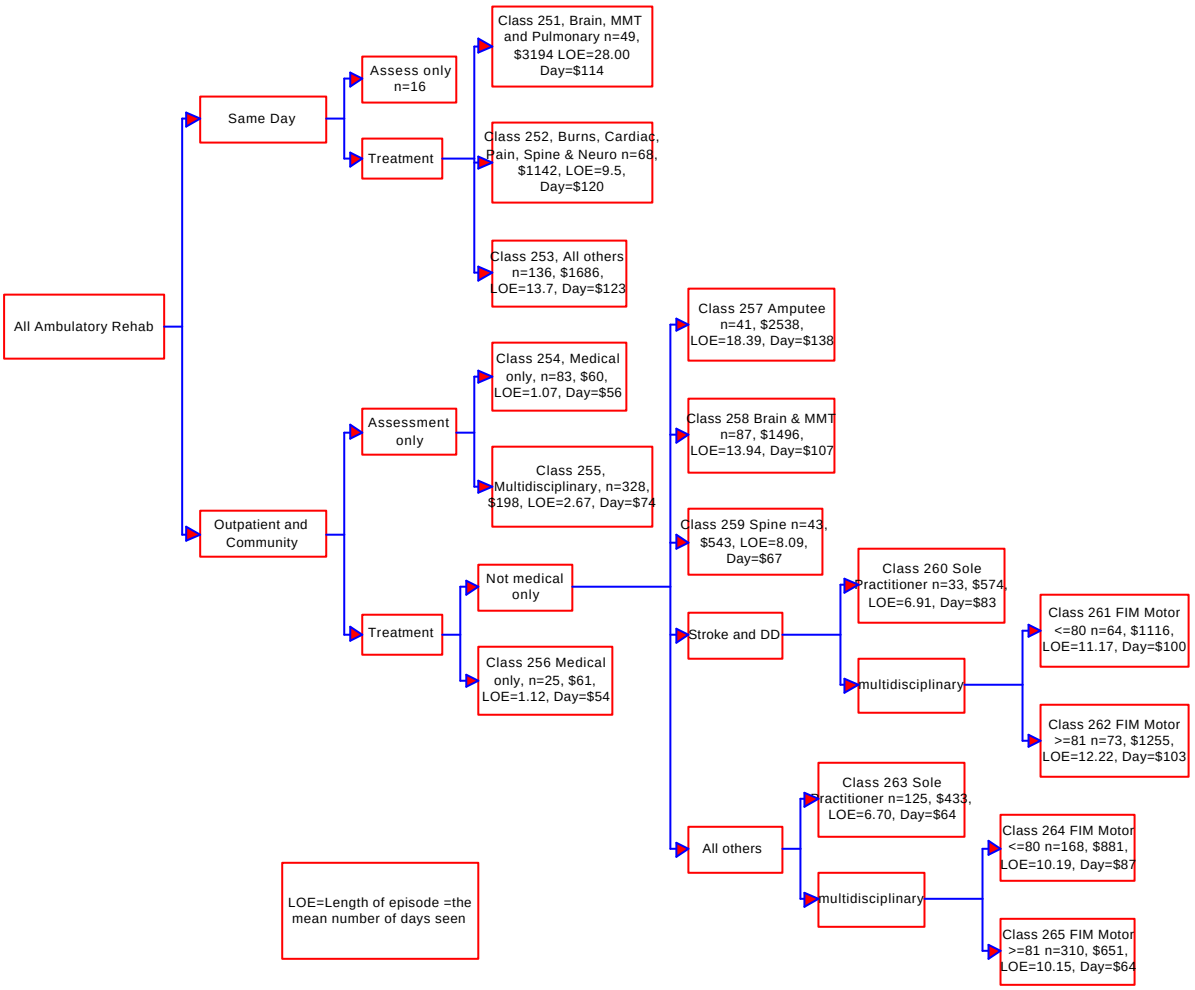
One possibility is that, for stroke, those with a higher FIM score are assessed as having greater capacity for further functional gain. Further analysis of the data would be required to determine whether those with a lower functional score were more likely to transfer to maintenance care.

This pattern was not repeated in the class containing the remaining 10 impairment codes (neurological, arthritis, pain syndromes, orthopaedic conditions, cardiac, pulmonary, burns, congenital deformities, other disabling conditions and debility). They followed the same pattern seen in the overnight episodes. The low FIM score group were more costly on both a per episode and a per diem basis.

The recommended classification is shown in Figure 176. It has 15 classes (4 assessment classes and 11 treatment classes) and achieved 28.58% reduction in variance. Each class was investigated for outliers, using the interquartile range technique described in Section 5.1. Only 11 episodes were considered to be outliers, and were dropped before the class cost details in Figure 176 were calculated. Perhaps the most important achievement is that the classification structure is regarded as being a sensible framework for further refinement over time.

The implications of this model of ambulatory rehabilitation classification are discussed in Section 7.6.2.

Figure 176 Ambulatory Rehabilitation - Recommended Model



5.7.3 Ambulatory psychogeriatric

Data Preparation

The analysis of the ambulatory psychogeriatric sample began by removing all incomplete episodes from the data set. These incomplete episodes had straddled either the start or the end of the study period (see Section 4.4.1). There were 194 partial episodes and they represented 41% of the ambulatory psychogeriatric sample. There were then 277 episodes that were useable for class finding. There were only 3 same day episodes in the available data set. The cost structure of these 3 episodes looked quite different to the outpatient and community episodes but, with only 3 observations, it would not be possible to analyse them. They were removed as outliers. The next step was to apply the standard cost for medical time and to apply the additional data edits as described in Section 5.7 above. Two outpatient episodes were excluded as outliers in this process. The remaining 272 episodes were used for class finding. All of these episodes were either outpatient or community episodes.

Classification Design

There were 63 'Assessment Only' episodes and 209 treatment episodes. Unlike the rehabilitation episodes, the best variable for explaining cost variation within the Assessment Only group was episode type. Outpatient episodes were nearly twice as expensive as community episodes. Two separate classes were created, one for each type of assessment episode.

All single variables were then tested on the treatment episodes to identify those that had most potential in the classification. Subject to satisfactory performance, those variables used to classify the overnight episodes would also be used to classify the ambulatory episodes. However, it was possible that variables not used to define the overnight classes would prove to be better predictors of cost for ambulatory care.

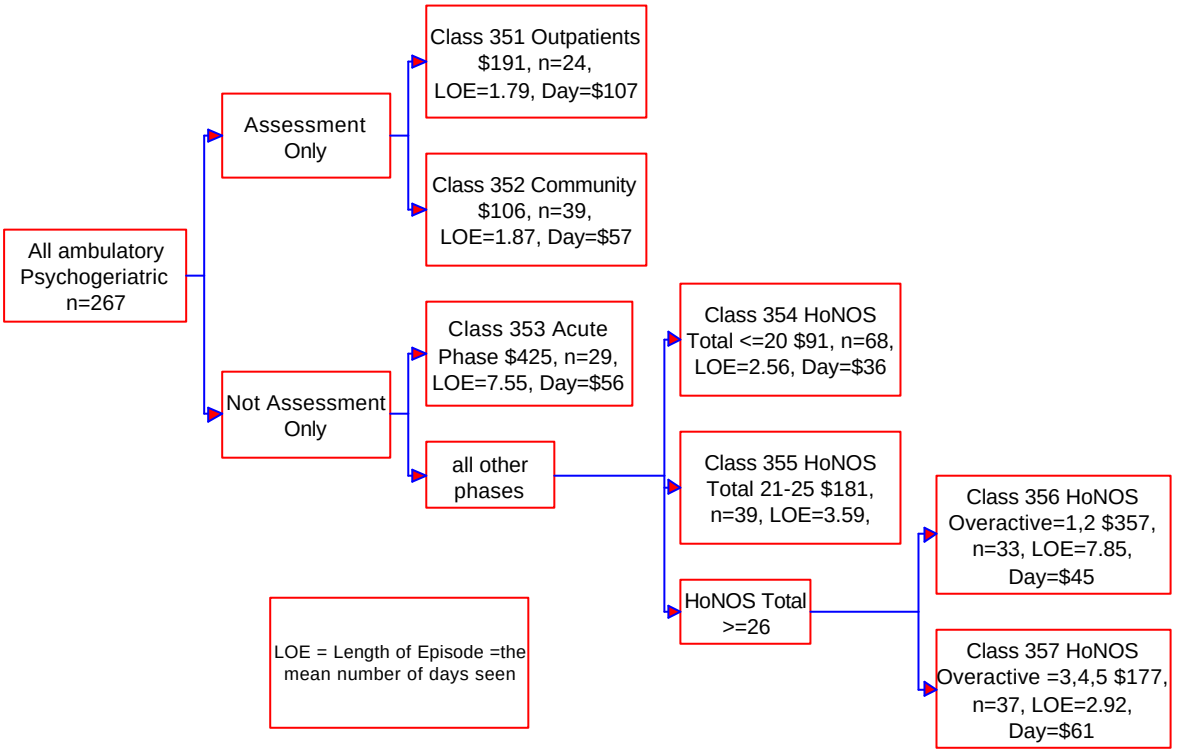
This proved to be the case. The variable 'phase' had not explained any of the variance between the overnight episodes but it proved to be the best single predictor of cost for the ambulatory psychogeriatric episodes. The recommended split was the establishment of a separate class for the 'acute phase' (see page 91). Nearly 70% of overnight episodes had been assigned to the acute phase. Only 23% of the community episodes (n=32), and none of the outpatient episodes, had been assigned to the acute phase. The community acute phase episodes proved to be the most costly on an episode basis but not on a per diem basis. They were grouped together to form a class.

The HoNOS proved to be the best variable to use to explain cost differences between the remaining episodes. As with the overnight episodes, both the HoNOS Total and the HoNOS Overactivity item were the most predictive scores. However, this time the assignment order was reversed. The Overactivity item was only useful for explaining differences in cost between those with a high HoNOS total.

The resultant classification is shown in Figure 177. It has 7 final classes (2 assessment and 5 treatment classes) and explains 20.06% of the variance in cost per episode with trimmed data. Only five episodes were trimmed out with the interquartile range trim described in Section 5.1. Like the overnight branch, the groups are small but relatively homogeneous.

The implications of this model of ambulatory psychogeriatric classification are discussed in Section 7.6.3.

Figure 177 Ambulatory Psychogeriatrics - Recommended Model



5.7.4 Ambulatory Geriatric Evaluation and Management

Data Preparation

The analysis of the ambulatory geriatric evaluation and management sample began by removing all incomplete episodes from the data set. These incomplete episodes had straddled either the start or the end of the study period (see Section 4.4.1). There were 571 partial episodes and they represented 18% of the ambulatory geriatric evaluation and management sample. The next step was to apply the standard cost for medical time and to apply the additional data edits as described in Section 5.7 above. 60 complete and ongoing episodes (2.3%) were excluded as outliers in this process. The remaining 2,544 episodes were used for class finding.

Classification Design

Of the 2,544 episodes, 1,974 (78%) were for 'Assessment Only'. The majority of these episodes were provided by Aged Care Assessment Teams (ACAT). 'Assessment Only' episodes were defined as those in which the person was seen on one occasion only for assessment and/or treatment and no further intervention by the service/team was planned. The Study Manual instructed sites that, if a person was booked for a subsequent treatment, the episode was not 'Assessment Only'. If a person was booked for subsequent assessment (but not treatment), they were defined as 'Assessment Only'. Thus, 'Assessment Only' episodes could include one-off treatment provided during an assessment and could also include an assessment that took place over more than one day.

Only limited information was collected on 'Assessment Only' episodes. Sites simply recorded client identifiers, date of birth and Episode Type (overnight, same day, outpatient or community). Service utilisation data collected for 'Assessment Only' episodes was the same as for treatment episodes. It included staff time by designation, atypical and expensive goods and services, pathology, imaging, and drug costs.

Given that no clinical information had been collected on 'Assessment Only' episodes, there was little data available for analysis of 78% of the total ambulatory Geriatric Evaluation and Management data set. Three classes were created based on provider characteristics rather than patient characteristics.

One class was created for same day assessment only episodes. This class proved to have the highest per diem costs of any of the ambulatory Geriatric Evaluation and Management classes, and, on a per diem basis, was nearly twice as expensive as same day treatment episodes. It has a coefficient of variance of 1.17 indicating that this group is relatively heterogeneous. However, no other information was available for further analysis of this class.

There were no differences in the cost of outpatient and community assessment episodes. Two classes were created that included both types of episode. One class was established for medical assessments. These were episodes with medical time and in which the cost of all other staff time was less than $20.00. This class was quite homogeneous (CV=0.81).

One class was established for multidisciplinary assessments. This class was the largest of the classes (n=1494) and was relatively heterogeneous (CV=1.11). However, no other information was available for further refinement of this group.

All single variables were then tested on the treatment episodes to identify those that had most potential in the classification. Subject to satisfactory performance, those variables used to classify the overnight episodes would also be used to classify the ambulatory episodes. However, it was possible that variables not used to define the overnight classes would prove to be better predictors of

cost for ambulatory care. This proved to be the case as same day episodes were significantly different in cost to outpatient and community episodes.

As with the Assessment Only episodes, a separate class was created for Same Day treatment episodes. This class contained 58 episodes and was relatively homogeneous (CV=0.83). This class had the highest episode costs ($1,716) but the average per diem cost was only $97.

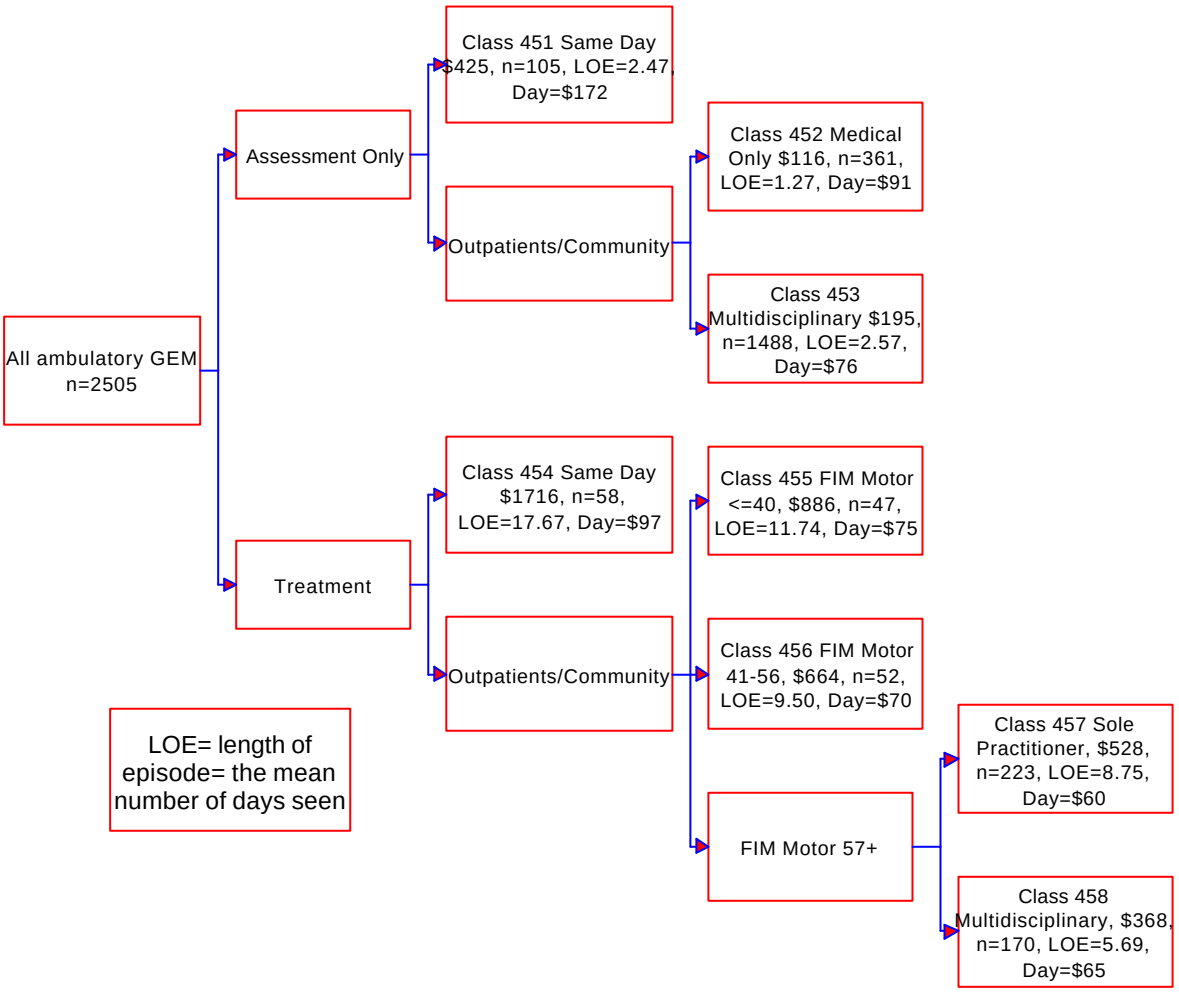
The cost of outpatient and community treatment episodes was not significantly different. They were therefore grouped together. The best single predictor of cost within this group was the FIM Motor Score. Two low FIM Motor Score groups were established as terminating classes. Further splits were desirable within each of these classes but neither had sufficient volume to do so. One class contained 48 episodes (FIM Motor less than 40), the other contained 52 episodes (FIM Motor 41-56).

411 episodes has a FIM Motor Score greater than 57. Several variables explained variation within this group. The best predictor was whether the care was provided by a Sole Practitioner (n=178) or by a multidisciplinary team (n=233). Possible splits within these classes were investigated. However, in each case, no sensible binary splits were possible and the volumes were insufficient to justify sub-dividing each group into multiple classes. They were therefore left as terminating classes.

The recommended classification is shown in Figure 178. It has 8 classes (3 for Assessment Only and 5 for treatment) and achieved 37.75% reduction in variance after trimming. This was the best statistical result of any of the ambulatory branches. When the interquartile range outlier trim was applied, as described in Section 5.1, 39 episodes were excluded. Average costs and other statistics in Figure 178 are calculated using these trimmed data.

The implication of this model of ambulatory Geriatric Evaluation and Management classification are discussed in Section 7.6.4.

Figure 178 Ambulatory Geriatric Evaluation & Management (GEM) - Recommended Model



5.7.5 Ambulatory Maintenance

Data Preparation

The analysis of the ambulatory maintenance sample began by removing all incomplete episodes from the data set. These incomplete episodes had straddled either the start or the end of the study period (see Section 4.4.1). There were 3,352 partial episodes and they represented 44% of the ambulatory maintenance sample. The next step was to apply the standard cost for medical time and to apply the additional data edits as described in Section 5.7 above. 84 complete and ongoing episodes (1.9%) were excluded as outliers in this process. In addition, the data from one site was removed for the purposes of the analysis because of data quality problems. This site had 74 ambulatory maintenance episodes. The remaining 4,185 episodes were used for class finding.

Classification Design

As with the Geriatric Evaluation and Management episodes, a significant proportion of the ambulatory maintenance episodes were for “Assessment Only”. There were 977 Assessment Only episodes and they constituted 23% of the ambulatory maintenance data set. Again, no clinical data had been collected on these episodes.

There were 40 episodes where a significant proportion of the episode cost was in medical and surgical supplies. For these episodes, the cost of medical and surgical supplies was greater than $500. These episodes were significantly different to the other ambulatory episodes and were grouped together. However, a separate class for this group was not created as high cost medical and surgical supplies are best funded through other mechanisms.

The definition of the Maintenance Case Type was the only one not to include the provision of care by a multidisciplinary team. For maintenance episodes, care could be provided by only one discipline or by a full multidisciplinary team.

The best single variable for explaining cost variations within the Assessment Only episodes was the type of provider. It was more predictive of cost than type of episode.

Four classes were created which were defined by type of provider. One was for multidisciplinary assessment. Separate classes were established for three provider groups.

In each case, the rule for defining the class was the same. An episode was assigned to the Nursing Assessment Class if the care was provided by nurses and the total costs of all other disciplines was less than $20. An episode was assigned to the Psychosocial Assessment Class if the care was provided by social workers, psychologists, Aboriginal health workers, or chaplains and the total costs of all other disciplines was less than $20. An episode was assigned to the Physical Therapy Assessment Class if the care was provided by physiotherapists, occupational therapists, speech pathologists or therapy aids and the total costs of all other disciplines was less than $20. In total, 55% of all Assessment Only episodes were allocated to these classes. For these groups, the Episode Type (Same Day, Outpatient or Community) was not predictive of cost and so separate classes based on type of episode were not established.

All other assessment episodes were assigned to the Multidisciplinary Assessment group (n=434). For this group, the type of episode was predictive of costs. Same day and community episodes were grouped together to form one class (n=301). There were only 3 same day episodes and they were within the bottom end of the cost range of the community episodes. Outpatient episodes were grouped together to form a separate class (n=133). Outpatient episodes were significantly less expensive than community episodes on both a per diem and per episode basis. Both classes were

quite heterogeneous but no further analysis was possible because no clinical data were available.

Type of provider was also the best predictor of cost for the 3,049 maintenance and support episodes. There were only a few psychosocial episodes and they were included in the Multidisciplinary group.

In total, 1,889 episodes were for nursing maintenance and support. Within this group the best predictor of cost was age followed by the RUG-ADL. Diagnosis, Reason for Episode Start, Reason for Episode End and the RCI Behaviour Scale explained very little.

The age split suggested by the data was 36 years. The older age group (37 years plus) was then split into two terminating classes based on RUG-ADL score. The great majority of episodes had a RUG-ADL score of 4 and were grouped together into one class (n=1378). The remaining 318 episodes were grouped to form another class. None of the remaining variables were predictive of costs within these groups.

The same approach was supported by the data for the younger age group. Again, two terminating classes were established. Episodes with a RUG-ADL score of 4 were grouped in one class and all others grouped to create another class. Again, none of the remaining variables were predictive of costs within these classes.

The RUG-ADL was the best single variable predicting cost in the Physical Therapy maintenance and support group. Two classes were established - one for episodes with a RUG-ADL score of 4 or 5, and one for all other scores. Age was not predictive of costs for the physical therapy episodes.

Within the multidisciplinary maintenance and support group, the best predictor of cost was age. Two classes were supported by the data. The young group (26 years or less) had 75 episodes and, although a number of other variables looked promising, there were no sensible binary splits. They therefore formed a terminating class.

The older group (27 years plus) comprised 861 episodes. Within this group, the best predictor of cost was the RUG-ADL. This time the data supported a binary split with scores from 4 to 11 in one class and scores from 12 to 18 in another.

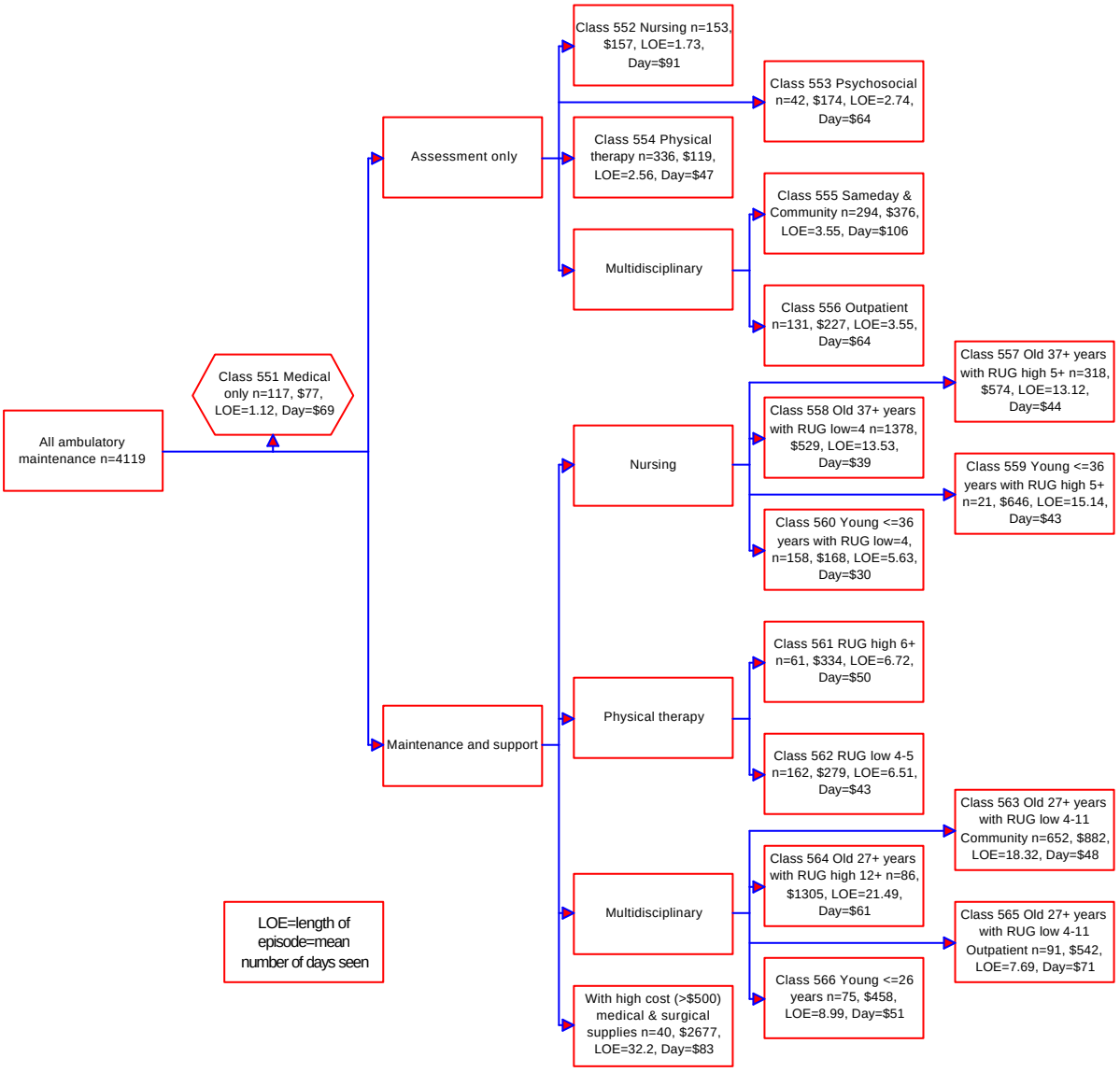
There were 773 episodes with a RUG-ADL score from 4 to 11. Within this group, the best predictor of cost was type of episode. The 95 outpatient episodes were grouped together to form a terminating class. The 678 community episodes formed another class. This group had a coefficient of variance of 1.07 but none of the remaining variables proved to be useful.

There were 88 episodes with a RUG-ADL score greater than 12. This group had a coefficient of variance of 1.20 but the only splits possible resulted in groups that were too small. They were therefore left as a terminating class.

The resultant classification is shown in Figure 179. It has 16 classes (6 for Assessment Only and 10 for Maintenance and Support) and explains 22.49% of the variance in episode costs. Like Palliative Care, it is likely that this result may have been confounded to some degree by factors such as shared care arrangements and patterns of multiple agency utilisation including the provision of services by General Practitioners, Home and Community Care agencies and other community nursing services and community care providers.

The implications of this model of ambulatory maintenance classification are discussed in Section 7.6.5.

Figure 179 Ambulatory Maintenance Care - Recommended Model



6. Results

6.1 Core and Final Costs

As outlined in Section 4.3.3, class finding was undertaken on the overnight episodes using only the Core Costs shown in Figure 32. Medical costs, volunteer time and the costs of imaging, pathology, pharmacy and capital were excluded from the Core Costs used for class finding. These costs were then added back to derive a final cost for each class.

Figure 180 shows the proportion of Core Cost, Medical Cost and Other Costs for each Case and Episode Type. The purpose of this figure is not to show the actual cost for each Case Type but simply to assess the relativities between Case Types and Episode Types. The data includes the cost of complete, ongoing and partial episodes. It also includes the costs of those episodes in rehabilitation services that collected data for over 3 months. In consequence, the figures differ from those reported elsewhere on Core Cost by Case Type and by Episode Type and from the final figures reported in Appendix 13 and Appendix 14.

With the exception of medical costs, all figures shown are the mean costs across all sites. For the reasons outlined in Figure 35, medical costs are not based on this method. Instead, medical costs have been calculated by applying a standard hourly rate of $52.90. This figure was derived from a subset of public sector sites. The medical time reported in this figure is the mean across all sites. The 'Other Costs' include imaging, pathology, pharmacy and capital depreciation.

The significant majority of costs for all Case Types in overnight care were incorporated in the Core Costs used for class finding. There was no evidence to suggest that the exclusion of the remaining costs from class finding acted to distort the relativities between the Case Types. The results for each class are included in the Appendices.

This was not the case for the outpatient episodes (see Figure 180). The cost structure of outpatient episodes was significantly different to that of both the overnight episodes and the community episodes. Specifically, the results suggested that medical time, and therefore medical cost, constituted a significant proportion of the total costs of outpatient care. Further, the proportions were not consistent across Case Types. For the Psychogeriatric and the Geriatric Evaluation and Management episodes, medical costs constituted more than 30% of the total episode cost.

Given this result, it was decided that Core Costs alone could not be used for class finding for the ambulatory episodes. To use Core Costs alone would distort the relativities between the three Episode Types as well as between the five Case Types. Instead, the sum of Core Cost and medical cost would be used for the purposes of class finding. As with the data shown in Figure 180, medical costs were calculated using a standard hourly rate of $52.90 per hour. This was necessary because the costs of medical services at some sites were not included in the site's operating costs because they were funded through other means. In particular, the medical costs of privately referred outpatients at most sites were met by the Health Insurance Commission (Medicare) and different arrangements were in place at some private sector sites.

Figure 180 Proportion of Core Costs, Medical Costs and Other Cost by Case and Episode Type

	Overnight		Same day		Outpatient		Community	
	Mean $	%	Mean $	%	Mean $	%	Mean $	%
Palliative Care								
Core Cost	4238.28	89.90	597.20	76.91	307.23	71.69	724.91	93.93
Medical Cost	295.24	6.05	94.02	12.10	108.78	25.38	34.02	4.41
Other Cost	190.97	4.05	85.30	10.99	12.53	2.93	12.80	1.66
Total Cost	4714.49	100.0	776.52	100.0	428.54	100.0	771.73	100.0
Rehabilitation								
Core Cost	5654.96	92.67	1657.57	90.83	830.36	92.54	623.11	97.50
Medical Cost	206.23	3.39	63.58	3.49	36.82	4.10	9.69	1.51
Other Cost	239.26	3.92	103.73	5.68	30.14	3.36	6.28	0.99
Total Cost	6100.45	100.0	1824.88	100.0	897.31	100.0	639.07	100.0
Psychogeriatric								
Core Cost	8128.02	92.90	6635.77	97.85	86.69	57.44	270.70	95.69
Medical Cost	322.60	3.69	61.78	0.90	60.66	35.44	10.57	3.73
Other Cost	298.60	3.41	84.54	1.25	10.74	7.12	1.64	0.58
Total Cost	8749.23	100.0	6782.09	100.0	150.91	100.0	282.91	100.0
Geriatric Evaluation and Management								
Core Cost	4256.71	87.51	1224.28	82.88	173.34	56.00	277.07	88.70
Medical Cost	269.04	5.53	88.42	5.98	101.79	32.88	28.24	9.04
Other Cost	338.44	6.96	164.54	11.14	34.43	11.12	7.04	2.26
Total Cost	4864.19	100.0	1477.23	100.0	309.57	100.0	312.35	100.0
Maintenance Care								
Core Cost	5632.99	92.81	821.95	87.84	285.30	82.11	565.59	99.02
Medical Cost	114.09	1.88	7.32	0.78	53.88	15.50	1.64	0.29
Other Cost	322.48	5.31	106.48	11.38	8.28	2.39	3.93	0.69
Total Cost	6069.55	100.0	935.76	100.0	347.45	100.0	571.16	100.0

6.2 The Five Final Products

Each of the participating sites in the SNAP study had up to 5 different roles:

- provision of services to overnight patients;
- provision of services to ambulatory clients;
- teaching;
- research; and
- health promotion.

Each of these 5 'final products' was costed using the methodology described in Section 4. A key feature of the costing methodology was the collection of a detailed log of staff time and the allocation of all costs on a daily basis to each of these 5 final products.

In total, 2.156 million hours of staff time were recorded in the SNAP data base. Across all sites and all disciplines, this staff time had an average cost of 47 cents a minute ($28.20 per hour). After the allocation of salary related overhead costs, the average final cost was 62 cents per minute ($37.20 per hour). In addition to these costs, the SNAP data base also included the cost of goods and services, imaging, pathology and non-staff related overhead costs.

The allocation of staff time between the 5 final products is shown in Figure 181. The allocation of time for out of scope patients (both primary care and acute) is included in the figures for both overnight and ambulatory patients. Each of the 5 final products has been allocated its share of general clinical and other overhead time using the algorithm shown in Figure 31. The costs and the time of designated teaching, research and health promotion staff were excluded from the data collection at most sites.

Figure 181 Allocation of Staff Time Between the Five Final Products

Product Type	Hours of Staff Time Reported	Percentage of Staff Time
Overnight patients	1,645,332	76.30%
Ambulatory clients	450,030	20.96%
Teaching and Learning	40,054	1.86%
Research	13,304	0.62%
Health Promotion	5,531	0.26%
TOTAL	**2,156,251**	**100.00%**

6.3 The recommended AN-SNAP Version 1 overnight classification and the national cost weight per class

The AN-SNAP Version 1 overnight classification has 66 classes and five branches, one for each of the five Case Types. The number of classes by Case Type are:

Palliative Care	11
Rehabilitation	32
Psychogeriatric Care	6
Geriatric Evaluation and Management	6
Maintenance Care	11

AN-SNAP Version 1 explains 47.29% of the variance in episode costs. There was minimal trimming of the data prior to class finding.

The overall structure of the classification is shown in Figure 182. The classification design for each Case Type was discussed in the previous section and the final classes within each branch were shown in Figures 168, 171, 172, 173 and 174. The reduction in variance within each Case Type is:

Palliative Care	20.98%
Rehabilitation	38.21%
Psychogeriatric Care	36.40%
Geriatric Evaluation and Management	9.97%
Maintenance Care	52.95%

Each class has been assigned a 3 digit class number. The first digit indicates the Case Type (1 for Palliative Care, 2 for Rehabilitation, 3 for Psychogeriatric, 4 for GEM and 5 for Maintenance). The second and third digits indicate the class number within each branch. Class numbers between 01 and 50 indicate classes for overnight episodes. Class numbers between 51 and 99 indicate classes for ambulatory care.

4 of the 66 classes contain long-term care episodes (1 in psychogeriatrics and 3 in maintenance care). In addition, both the Brain Dysfunction and Spinal Cord Dysfunction classes contain some long-term episodes. In these cases, the costs and the cost weights have been proportionally scaled to provide a standard 3 month episode cost. The funding implications of this approach are discussed in Sections 7.4 and 7.5.

A small number of the classes had low volumes of observations in this study. This was inevitable in a study that was a three month snapshot of only a proportion of sub-acute and non-acute care in Australia. Small volume classes were established in this first version of the classification only where the data demonstrated that the episodes were sufficiently different from other episodes (based on both statistical and clinical criteria) and sufficiently similar to each other to justify the creation of a separate class. Each of these classes should have well in excess of 200 cases per year if the classification is applied on a national basis.

Figure 183 provides a summary of the episode costs of each of the five Case Types. The first column shows only the Core Costs that were used to develop the classification. The second shows the percentage of 'Other Costs' by Case Type (see Figure 180). The third shows the average cost by Case Type after the inclusion of these 'Other Costs'. The last two columns illustrate the diversity within each of the Case Types by showing the class with the lowest average cost and the class with the highest average cost. In each case the standard percentage of 'Other Costs' for the Case Type has been used. There is a 30 fold variation in episode cost between the most expensive and the least expensive class in the classification.

Figure 182 The AN-SNAP Version 1 Classification of Overnight Care

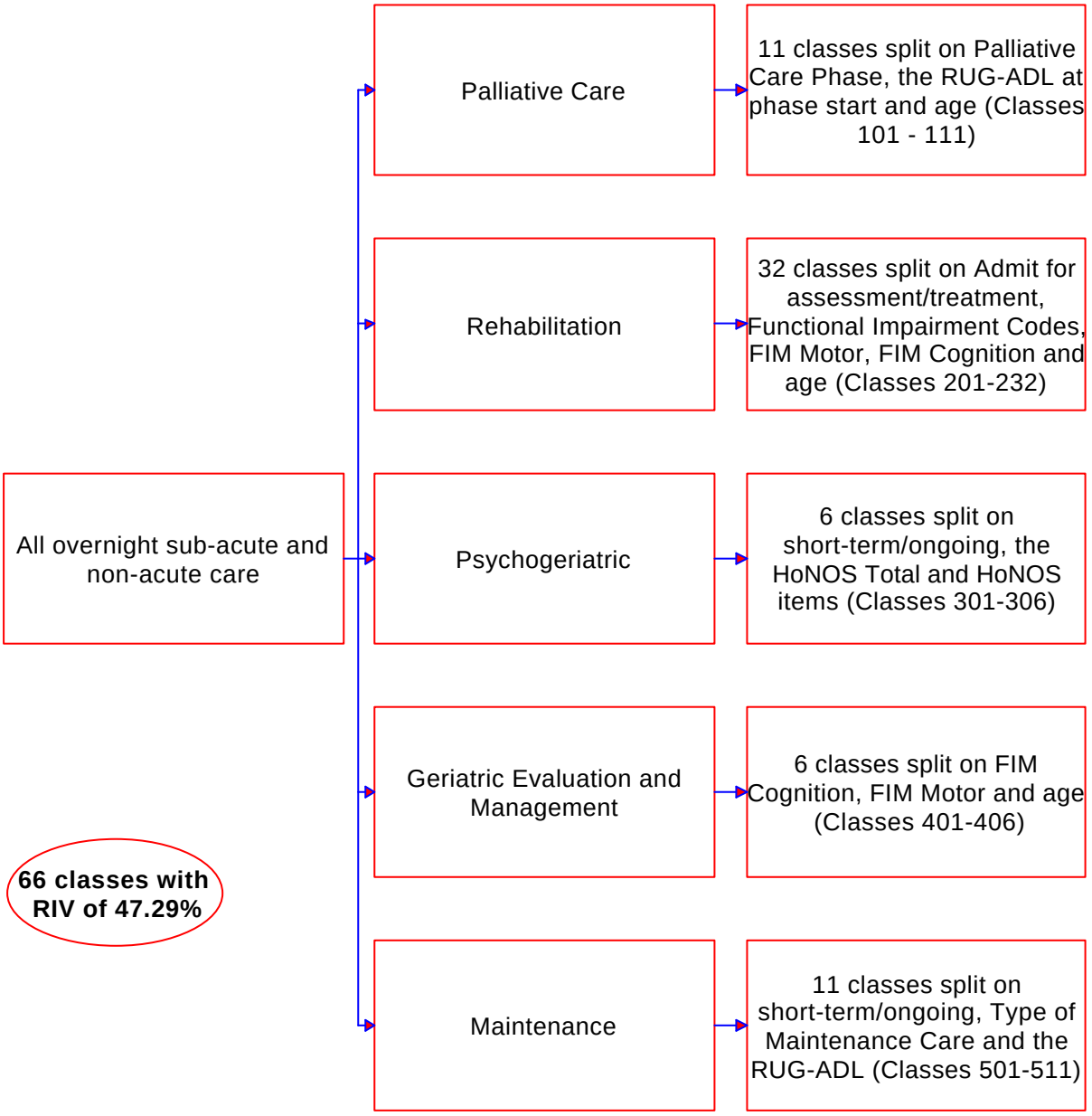


Figure 183 Summary of Episode Costs by Case Type - Overnight Care

Case Type	Average core episode cost[1]	% other costs	Average final episode cost[1]- all classes	Minimum episode cost class[1]	Maximum episode cost class[1]
Palliative Care [2]	$1,611	10.1%	$1,774	$1,105[3]	$3,489
Rehabilitation	$5,797	7.3%	$6,220	$2,238	$31,079
Psychogeriatrics[4]	$7,388	7.1%	$7,913	$4,517	$16,074
Geriatric Evaluation and Management	$4,053	12.5%	$4,560	$2,644	$5,645
Maintenance	$5,743	7.2%	$6,157	$2,227	$16,338

1 cost of Palliative Care Phase (not episode)
2 after trimming of 93 high cost outliers
3 excluding bereavement phase
4 after trimming of 10 high cost outliers

Figure 184 provides equivalent information about the per diem costs of each of the five Case Types. Again, the first column shows only the Core Costs. The second shows the percentage of 'Other Costs' by Case Type (see Figure 180). The third shows the average cost by Case Type after the inclusion of these 'Other Costs'. The last two columns illustrate the diversity within each of the Case Types by showing the class with the lowest average per diem cost and the class with the highest average per diem cost. In each case the standard percentage of 'Other Costs' for the Case Type has been used. There is a 5 fold variation in per diem cost between the most expensive and the least expensive class in the classification.

Figure 184 Summary of Per Diem Costs by Case Type - Overnight Care

Case Type	Average core per diem cost	% other costs	Average final per diem cost - all classes[1]	Minimum per diem cost class[1]	Maximum per diem cost class[1]
Palliative Care[2]	$273	10.1%	$301	$232	$385
Rehabilitation	$266	7.3%	$285	$159	$544
Psychogeriatrics[3]	$243	7.1%	$260	$181	$348
Geriatric Evaluation and Management	$229	12.5%	$258	$172	$277
Maintenance	$178	7.2%	$191	$114	$438

1 cost of Palliative Care Phase (not episode)
2 after trimming of 93 high cost outliers and with bereavement phase excluded
3 after trimming of 10 high cost outliers

The costs and cost weights for each of the 66 classes are shown in Figure 185. These results are based on Core Costs only. Final costs, episode cost weights, per diem costs, per diem cost weights, average length of stay, standard deviations and coefficients of variance are included in the Appendices.

Figure 185 AN-SNAP Version 1 Cost Weights - overnight episodes

Class	Case Type	Description	Core Cost	Cost weight
101	Palliative Care	Stable, RUG 4	$1,980	0.45
102	Palliative Care	Stable, RUG 5-17	$2,953	0.67
103	Palliative Care	Stable, RUG 18	$3,169	0.72
104	Palliative Care	Unstable, RUG 4-17	$2,338	0.53
105	Palliative Care	Unstable, RUG 18	$1,707	0.39
106	Palliative Care	Deteriorating, RUG 4-17	$2,193	0.50
107	Palliative Care	Deteriorating, RUG 18, age <=71	$2,066	0.47
108	Palliative Care	Deteriorating, RUG 18, age >=72	$1,367	0.31
109	Palliative Care	Terminal, RUG 4-16	$1,280	0.29
110	Palliative Care	Terminal, RUG 17-18	$945	0.22
111	Palliative Care	Bereavement	$327	0.07
201	Rehabilitation	Admit for assessment only	$1,188	0.27
202	Rehabilitation	Brain, Neuro, Spine and MMT, FIM 13	$29,186	6.67
203	Rehabilitation	All other impairments, FIM 13	$9,324	2.13
204	Rehabilitation	Stroke and Burns, motor 63-91, cognition 20-35	$4,715	1.08
205	Rehabilitation	Stroke and Burns, motor 63-91, cognition 5-19	$6,835	1.56
206	Rehabilitation	Stroke and Burns, motor 47-62	$7,101	1.62
207	Rehabilitation	Stroke and Burns, motor 14-46, age>=75	$8,633	1.97
208	Rehabilitation	Stroke and Burns, motor 14-46, age<=74	$13,057	2.98
209	Rehabilitation	Brain Dysfunction, motor 71-91	$4,429	1.01
210	Rehabilitation	Brain Dysfunction, motor 29-70, age>=55	$6,153	1.41
211	Rehabilitation	Brain Dysfunction, motor 29-70, age<=54	$11,086	2.53
212	Rehabilitation	Brain Dysfunction, motor 14-28	$21,340	4.88
213	Rehabilitation	Neurological, motor 74-91	$3,534	0.81
214	Rehabilitation	Neurological, motor 41-73	$5,689	1.30
215	Rehabilitation	Neurological, motor 14-40	$8,344	1.91
216	Rehabilitation	Spinal Cord Dysfunction, motor 81-91	$2,709	0.62
217	Rehabilitation	Spinal Cord Dysfunction, motor 47-80	$7,635	1.74
218	Rehabilitation	Spinal Cord Dysfunction, motor 14-46	$18,470	4.22
219	Rehabilitation	Amputation of limb, motor 66-91	$5,069	1.16
220	Rehabilitation	Amputation of limb, motor 47-65	$8,674	1.98
221	Rehabilitation	Amputation of limb, motor 14-46	$9,915	2.27
222	Rehabilitation	Pain Syndromes	$3,352	0.77
223	Rehabilitation	Orthopaedic conditions, motor 74-91	$2,814	0.64
224	Rehabilitation	Orthopaedic conditions, motor 58-73	$4,295	0.98
225	Rehabilitation	Orthopaedic conditions, motor 52-57	$5,687	1.30
226	Rehabilitation	Orthopaedic conditions, motor 14-51	$7,175	1.64
227	Rehabilitation	Cardiac	$4,930	1.13
228	Rehabilitation	Major Multiple Trauma	$7,031	1.61
229	Rehabilitation	All other impairments, motor 67-91	$3,268	0.75
230	Rehabilitation	All other impairments, motor 53-66	$4,562	1.04
231	Rehabilitation	All other impairments, motor 25-52	$5,521	1.26
232	Rehabilitation	All other impairments, motor 14-24	$7,861	1.80
301	Psychogeriatric	HoNOS Overactive behaviour 4,5	$8,105	1.85
302	Psychogeriatric	HoNOS Overactive behaviour 2,3, ADL 5	$7,602	1.74
303	Psychogeriatric	HoNOS Overactive behaviour 2,3, ADL 1-4	$5,956	1.36
304	Psychogeriatric	HoNOS Overactive behaviour 1, HoNOS total>=30	$6,163	1.41
305	Psychogeriatric	HoNOS Overactive behaviour 1, HoNOS total<=29	$4,289	0.98
306	Psychogeriatric	Long term care	$15,235	3.48
401	GEM	Cognition<=15, motor 13-43	$5,068	1.16
402	GEM	Cognition<=15, motor 44-91, age>=84	$4,775	1.09
403	GEM	Cognition<=15, motor 44-91, age<=83	$3,006	0.69
404	GEM	Cognition 16-35, motor 13-50	$3,790	0.87
405	GEM	Cognition 16-35, motor 51-77	$3,166	0.72
406	GEM	Cognition 16-35, motor 78-91	$2,115	0.48
501	Maintenance	Respite, RUG 15-18	$4,022	0.92
502	Maintenance	Respite, RUG 5-14	$3,082	0.70
503	Maintenance	Respite, RUG 4	$2,077	0.47
504	Maintenance	Nursing Home Type, RUG 11-18	$4,780	1.09
505	Maintenance	Nursing Home Type, RUG 4-10	$3,986	0.91
506	Maintenance	Convalescent care	$2,003	0.46
507	Maintenance	Other Maintenance, RUG 14-18	$2,532	0.58
508	Maintenance	Other Maintenance, RUG 4-13	$4,236	0.97
509	Maintenance	Long term care, RUG 17-18	$14,698	3.36
510	Maintenance	Long term care, RUG 10-16	$12,943	2.96
511	Maintenance	Long term care, RUG 4-9	$9,213	2.11
ALL OVERNIGHT EPISODES			$4,376	1.00

6.4 The recommended AN-SNAP Version 1 ambulatory classification and the national cost weight per class

The AN-SNAP Version 1 ambulatory classification has 68 classes and five branches, one for each of the five Case Types. The number of classes by Case Type are:

Palliative Care	22
Rehabilitation	15
Psychogeriatric Care	7
Geriatric Evaluation and Management	8
Maintenance Care	16

AN-SNAP Version 1 explains 28.11% of the variance in ambulatory episode costs.

The overall structure of the classification is shown in Figure 186. The classification design for each Case Type was discussed in the previous section and the final classes within each branch were shown in Figures 175, 176, 177, 178 and 179. The reduction in variance within each Case Type is:

Palliative Care	17.14%
Rehabilitation	28.58%
Psychogeriatric Care	20.06%
Geriatric Evaluation and Management	37.75%
Maintenance Care	22.49%

Each class has been assigned a 3 digit class number. The first digit indicates the Case Type (1 for Palliative Care, 2 for Rehabilitation, 3 for Psychogeriatric, 4 for GEM and 5 for Maintenance). The second and third digits indicate the class number within each branch. Class numbers between 01 and 50 indicate classes for overnight episodes. Class numbers between 51 and 99 indicate classes for ambulatory care.

Several of the classes contain long-term care episodes. In these cases, the costs and the cost weights are based on the package of care provided over a 3 month episode. The funding implications of this approach are discussed in Sections 7.4 and 7.5.

Figure 187 provides a summary of the episode costs of each of the five Case Types. The first column shows only the sum of the Core Costs and the medical costs that were used to develop the classification. The second shows the percentage of remaining costs by Case Type (see Figure 180). The third shows the average cost by Case Type after the inclusion of these remaining costs. The last two columns illustrate the diversity within each of the Case Types by showing the class with the lowest average cost and the class with the highest average cost. In each case, the standard percentage of 'Other Costs' for the Case Type has been used. There is a 48 fold variation in episode cost between the most expensive and the least expensive class in the classification.

Figure 186 The AN-SNAP Version 1 Classification of Ambulatory Care

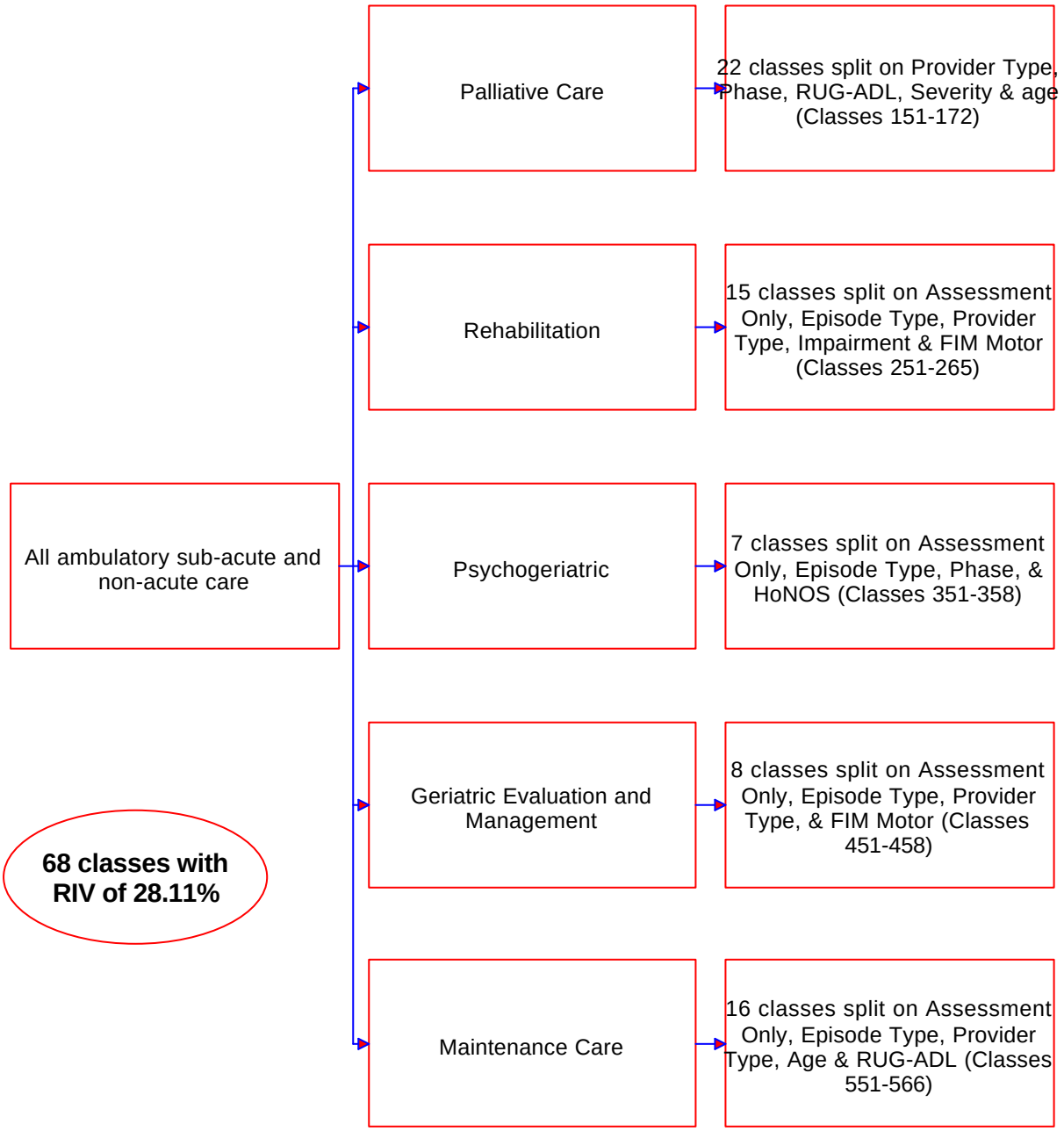


Figure 187 Summary of Episode Costs by Case Type - Ambulatory Care

Case Type	Average core & medical episode cost	% other costs	Average final episode cost - all classes	Minimum episode cost class	Maximum episode cost class
Palliative Care	$538	1.9%	$548	$160	$987
Rehabilitation	$849	3.8%	$881	$69	$3,315
Psychogeriatrics	$204	1.4%	$207	$92	$487
Geriatric Evaluation and Management	$304	6.2%	$323	$132	$1,822
Maintenance	$524	1.0%	$529	$82	$1,289

Figure 188 provides equivalent information about the per diem costs of each of the five Case Types. Again, the first column shows only the sum of Core and Medical Costs. The second shows the percentage of remaining costs by Case Type (see Figure 180). The third shows the average cost by Case Type after the inclusion of these remaining costs. The last two columns illustrate the diversity within each of the Case Types by showing the class with the lowest average per diem cost and the class with the highest average per diem cost. In each case, the standard percentage of remaining costs for the Case Type has been used. Like the overnight classification, there is a 5 fold variation in per diem cost between the most expensive and the least expensive class in the classification.

Figure 188 Summary of Per Diem Costs by Case Type - Ambulatory Care

Case Type	Average core & medical per diem cost	% other costs	Average final per diem cost - all classes	Minimum per diem cost class	Maximum per diem cost class
Palliative Care	$93	1.9%	$95	$57	$134
Rehabilitation	$95	3.8%	$99	$59	$143
Psychogeriatrics	$52	1.4%	$53	$37	$108
Geriatric Evaluation and Management	$78	6.2%	$83	$66	$190
Maintenance	$48	1.0%	$49	$33	$124

The costs and cost weights for each of the 68 classes are shown in Figure 189. These results are based on Core Costs plus medical costs. Final costs, episode cost weights, per diem costs, per diem cost weights, average length of episode data, standard deviations and coefficients of variance are included in the Appendices.

Figure 189 AN-SNAP Version 1 Cost Weights - Ambulatory Care

Class	Case Type	Episode Type	Description	Core + Dr	Cost weight
151	Palliative Care	All ambulatory	Medical only	$157	0.31
152	Palliative Care	All ambulatory	Therapies only	$254	0.50
153	Palliative Care	All ambulatory	Stable, Multidisciplinary	$987	1.94
154	Palliative Care	All ambulatory	Stable, Nursing only, severity<=10, RUG 4, age>=67	$330	0.65
155	Palliative Care	All ambulatory	Stable, Nursing only, severity<=10, RUG 4, age<=66	$483	0.95
156	Palliative Care	All ambulatory	Stable, Nursing only, severity<=10, RUG 5-18	$696	1.37
157	Palliative Care	All ambulatory	Stable, Nursing only, severity>=11	$704	1.38
158	Palliative Care	All ambulatory	Unstable, Multidisciplinary, RUG 4, severity<=11	$568	1.12
159	Palliative Care	All ambulatory	Unstable, Multidisciplinary, RUG 4, severity>=12	$834	1.64
160	Palliative Care	All ambulatory	Unstable, Multidisciplinary, RUG 5-18	$832	1.63
161	Palliative Care	All ambulatory	Unstable, Nursing only, RUG<=14, age>=60	$372	0.73
162	Palliative Care	All ambulatory	Unstable, Nursing only, RUG<=14, age<=59	$631	1.24
163	Palliative Care	All ambulatory	Unstable, Nursing only, RUG>=15	$879	1.73
164	Palliative Care	All ambulatory	Deteriorating, Multidisciplinary, severity <=10	$626	1.23
165	Palliative Care	All ambulatory	Deteriorating, Multidisciplinary, severity>=11, RUG<=10	$731	1.44
166	Palliative Care	All ambulatory	Deteriorating, Multidisciplinary, severity>=11, RUG>=11	$969	1.90
167	Palliative Care	All ambulatory	Deteriorating, Nursing only, RUG 4	$410	0.81
168	Palliative Care	All ambulatory	Deteriorating, Nursing only, RUG 5-18	$501	0.98
169	Palliative Care	All ambulatory	Terminal, Multidisciplinary	$630	1.24
170	Palliative Care	All ambulatory	Terminal, Nursing only	$381	0.75
171	Palliative Care	All ambulatory	Bereavement, age >=45	$152	0.30
172	Palliative Care	All ambulatory	Bereavement, age <=44	$504	0.99
251	Rehabilitation	Same Day	Brain, MMT & Pulmonary	$3,194	6.28
252	Rehabilitation	Same Day	Burns, Cardiac, Pain, Spine, & Neuro	$1,142	2.24
253	Rehabilitation	Same Day	All other impairments	$1,686	3.31
254	Rehabilitation	Outpatient & Community	Assess, Medical Only	$60	0.12
255	Rehabilitation	Outpatient & Community	Assess, Multidisciplinary	$198	0.39
256	Rehabilitation	Outpatient & Community	Treat, Medical Only	$61	0.12
257	Rehabilitation	Outpatient & Community	Amputation	$2,538	4.99
258	Rehabilitation	Outpatient & Community	Brain Injury and MMT	$1,496	2.94
259	Rehabilitation	Outpatient & Community	Spinal Injury	$543	1.07
260	Rehabilitation	Outpatient & Community	Stroke and DD, Sole Practitioner	$574	1.13
261	Rehabilitation	Outpatient & Community	Stroke and DD, Multidisciplinary, FIM Motor <=80	$1,116	2.19
262	Rehabilitation	Outpatient & Community	Stroke and DD, Multidisciplinary, FIM Motor >=81	$1,255	2.47
263	Rehabilitation	Outpatient & Community	All other impairments, Sole Practitioner	$433	0.85
264	Rehabilitation	Outpatient & Community	All other impairments, Multidisciplinary, FIM Motor <=80	$881	1.73
265	Rehabilitation	Outpatient & Community	All other impairments, Multidisciplinary, FIM Motor >=81	$651	1.28
351	Psychogeriatric	Outpatient	Assessment Only	$191	0.38
352	Psychogeriatric	Community	Assessment Only	$106	0.21
353	Psychogeriatric	All ambulatory	Treat, Acute Phase	$425	0.84
354	Psychogeriatric	All ambulatory	Treat, All Other Phases, HoNOS total <=20	$91	0.18
355	Psychogeriatric	All ambulatory	Treat, All Other Phases, HoNOS total 21-25	$180	0.35
356	Psychogeriatric	All ambulatory	Treat, All Other, HoNOS total >=26, HoNOS Overactive 1,2	$357	0.70
357	Psychogeriatric	All ambulatory	Treat, All Other, HoNOS total >=26, HoNOS Overactive 3,4,5	$177	0.35
451	GEM	Same Day	Assessment Only	$425	0.83
452	GEM	Outpatients & Community	Assess, Medical Only	$116	0.23
453	GEM	Outpatients & Community	Assess, Multidisciplinary	$195	0.38
454	GEM	Same Day	All Sameday	$1,716	3.37
455	GEM	Outpatients & Community	FIM Motor <=40	$886	1.74
456	GEM	Outpatients & Community	FIM Motor 41-56	$664	1.30
457	GEM	Outpatients & Community	FIM Motor>=57, Sole Practitioner	$528	1.04
458	GEM	Outpatients & Community	FIM Motor>=57, Multidisciplinary	$368	0.72
551	Maintenance	All ambulatory	Medical Only, all	$77	0.15
552	Maintenance	All ambulatory	Assess, Nursing	$157	0.31
553	Maintenance	All ambulatory	Assess, Psychosocial	$174	0.34
554	Maintenance	All ambulatory	Assess, Physical Therapy	$119	0.23
555	Maintenance	Same Day & Community	Assess, Multidisciplinary	$376	0.74
556	Maintenance	Outpatient	Assess, Multidisciplinary	$227	0.45
557	Maintenance	All ambulatory	Maintenance & Support, Nursing, age>=37, RUG>=5	$574	1.13
558	Maintenance	All ambulatory	Maintenance & Support, Nursing, age>=37, RUG 4	$529	1.04
559	Maintenance	All ambulatory	Maintenance & Support, Nursing, age<=36, RUG>=5	$646	1.27
560	Maintenance	All ambulatory	Maintenance & Support, Nursing, age<=36, RUG 4	$168	0.33
561	Maintenance	All ambulatory	Maintenance & Support, Physical Therapy, RUG>=6	$334	0.66
562	Maintenance	All ambulatory	Maintenance & Support, Physical Therapy, RUG 4,5	$279	0.55
563	Maintenance	Community	Maintenance & Support, Multidisc., age>=27, RUG 4-11	$882	1.73
564	Maintenance	All ambulatory	Maintenance & Support, Multidisc., age>=27, RUG>=12	$1,305	2.56
565	Maintenance	Outpatient	Maintenance & Support, Multidisc., age>=27, RUG 4-11	$542	1.06
566	Maintenance	All ambulatory	Maintenance & Support, Multidisc., <=26 yrs	$458	0.90
ALL AMBULATORY EPISODES				$509	1.00

6.5 The recommended AN-SNAP Version 1 all episode classification

The AN-SNAP Version 1 all episode classification has 134 classes and five branches, one for each of the five Case Types. AN-SNAP Version 1 explains 57.99% of the variation in all episode costs. Of this 58%, 21% was contributed by Episode Type and 37% by the classes.

The overall structure of the classification is shown in Figure 190. All episode cost weights are included in Figure 191. These cost weights have been calibrated based on the average classification cost of all episodes, both overnight and ambulatory. The classification cost is the set of costs used to develop the classification - the core cost for overnight episodes and the core plus medical cost for ambulatory episodes. Final costs for each class are included in the appendices.

The classification is designed to allow it to be used in several different ways:

- Each of the two major branches (overnight and ambulatory) can be employed on their own or in combination with another classification (such as DRGs) AND/OR

- The classes can be used on a ‘mix and match’ basis. For example, an overnight class can be combined with an ambulatory class to form a total payment for care that crosses treatment settings OR

- It may be possible that, with experience, each of the classes could be employed as a building block in the development of standard packages of care that encompass different treatment settings. The existing SNAP data set could be further analysed to assess the feasibility of moving from a classification of ‘episodes of care’ to a classification of ‘episodes of illness’.

Figure 190 The All Episode AN-SNAP Version 1 Classification

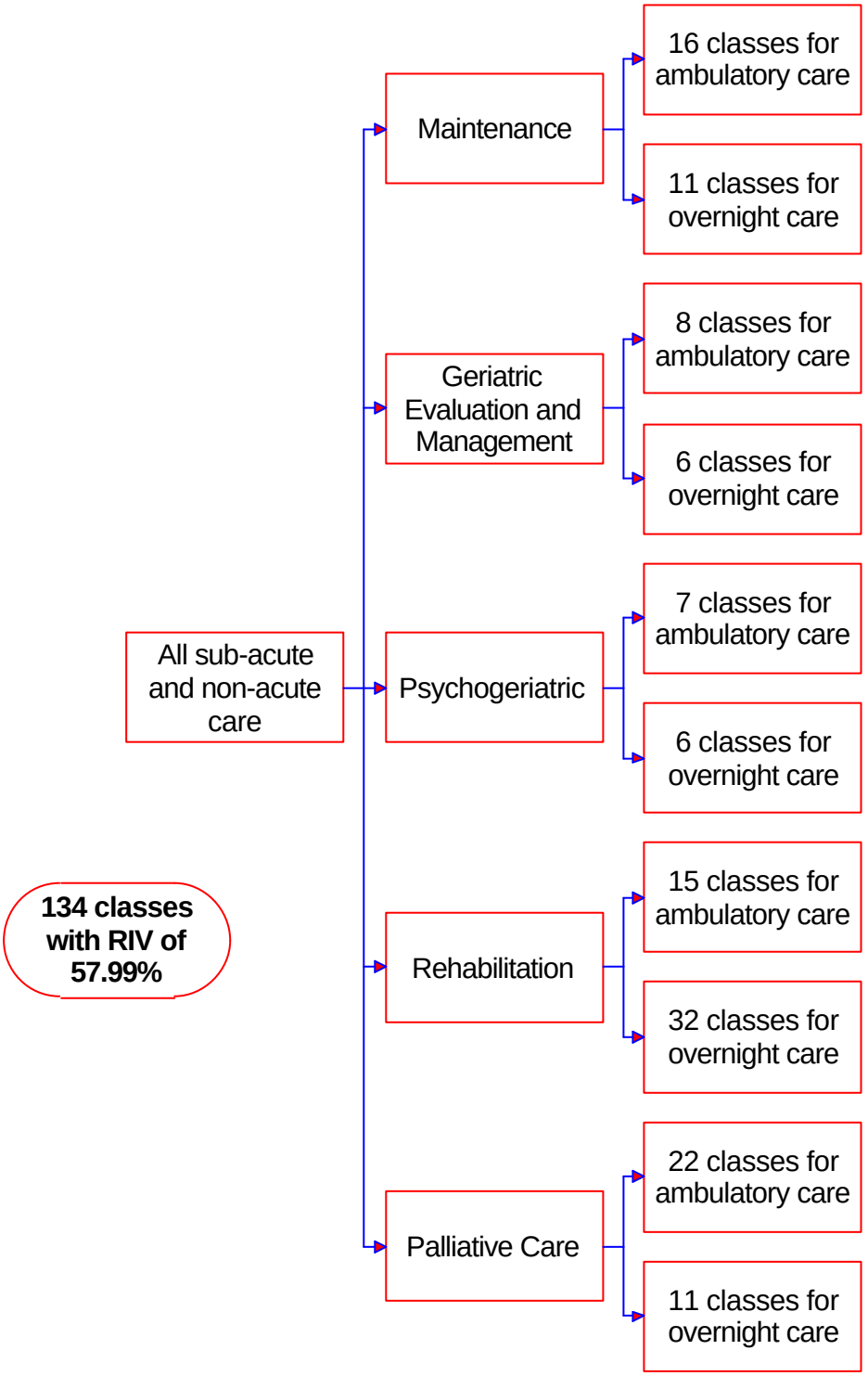


Figure 191 AN-SNAP Version 1 All Episode Cost Weights

Class	Case Type	Episode Type	Description	Core Cost	Cost weight
101	Palliative Care	Overnight	Stable, RUG 4	$1,980	0.83
102	Palliative Care	Overnight	Stable, RUG 5-17	$2,953	1.24
103	Palliative Care	Overnight	Stable, RUG 18	$3,169	1.33
104	Palliative Care	Overnight	Unstable, RUG 4-17	$2,338	0.98
105	Palliative Care	Overnight	Unstable, RUG 18	$1,707	0.71
106	Palliative Care	Overnight	Deteriorating, RUG 4-17	$2,193	0.92
107	Palliative Care	Overnight	Deteriorating, RUG 18, age <=71	$2,066	0.86
108	Palliative Care	Overnight	Deteriorating, RUG 18, age >=72	$1,367	0.57
109	Palliative Care	Overnight	Terminal, RUG 4-16	$1,280	0.54
110	Palliative Care	Overnight	Terminal, RUG 17-18	$945	0.40
111	Palliative Care	Overnight	Bereavement	$327	0.14
151	Palliative Care	All ambulatory	Medical only	$157	0.07
152	Palliative Care	All ambulatory	Therapies only	$254	0.11
153	Palliative Care	All ambulatory	Stable, Multidisciplinary	$987	0.41
154	Palliative Care	All ambulatory	Stable, Nursing only, severity<=10, RUG 4, age>=67	$330	0.14
155	Palliative Care	All ambulatory	Stable, Nursing only, severity<=10, RUG 4, age<=66	$483	0.20
156	Palliative Care	All ambulatory	Stable, Nursing only, severity<=10, RUG 5-18	$696	0.29
157	Palliative Care	All ambulatory	Stable, Nursing only, severity>=11	$704	0.29
158	Palliative Care	All ambulatory	Unstable, Multidisciplinary, RUG 4, severity<=11	$568	0.24
159	Palliative Care	All ambulatory	Unstable, Multidisciplinary, RUG 4, severity>=12	$834	0.35
160	Palliative Care	All ambulatory	Unstable, Multidisciplinary, RUG 5-18	$832	0.35
161	Palliative Care	All ambulatory	Unstable, Nursing only, RUG<=14, age>=60	$372	0.16
162	Palliative Care	All ambulatory	Unstable, Nursing only, RUG<=14, age<=59	$631	0.26
163	Palliative Care	All ambulatory	Unstable, Nursing only, RUG>=15	$879	0.37
164	Palliative Care	All ambulatory	Deteriorating, Multidisciplinary, severity <=10	$626	0.26
165	Palliative Care	All ambulatory	Deteriorating, Multidisciplinary, severity>=11, RUG<=10	$731	0.31
166	Palliative Care	All ambulatory	Deteriorating, Multidisciplinary, severity>=11, RUG>=11	$969	0.41
167	Palliative Care	All ambulatory	Deteriorating, Nursing only, RUG 4	$410	0.17
168	Palliative Care	All ambulatory	Deteriorating, Nursing only, RUG 5-18	$501	0.21
169	Palliative Care	All ambulatory	Terminal, Multidisciplinary	$630	0.26
170	Palliative Care	All ambulatory	Terminal, Nursing only	$381	0.16
171	Palliative Care	All ambulatory	Bereavement, age >=45	$152	0.06
172	Palliative Care	All ambulatory	Bereavement, age <=44	$504	0.21
201	Rehabilitation	Overnight	Admit for assessment only	$1,188	0.50
202	Rehabilitation	Overnight	Brain, Neuro, Spine and MMT, FIM 13	$29,186	12.21
203	Rehabilitation	Overnight	All other impairments, FIM 13	$9,324	3.90
204	Rehabilitation	Overnight	Stroke and Burns, motor 63-91, cognition 20-35	$4,715	1.97
205	Rehabilitation	Overnight	Stroke and Burns, motor 63-91, cognition 5-19	$6,835	2.86
206	Rehabilitation	Overnight	Stroke and Burns, motor 47-62	$7,101	2.97
207	Rehabilitation	Overnight	Stroke and Burns, motor 14-46, age>=75	$8,633	3.61
208	Rehabilitation	Overnight	Stroke and Burns, motor 14-46, age<=74	$13,057	5.46
209	Rehabilitation	Overnight	Brain Dysfunction, motor 71-91	$4,429	1.85
210	Rehabilitation	Overnight	Brain Dysfunction, motor 29-70, age>=55	$6,153	2.57
211	Rehabilitation	Overnight	Brain Dysfunction, motor 29-70, age<=54	$11,086	4.64
212	Rehabilitation	Overnight	Brain Dysfunction, motor 14-28	$21,340	8.93
213	Rehabilitation	Overnight	Neurological, motor 74-91	$3,534	1.48
214	Rehabilitation	Overnight	Neurological, motor 41-73	$5,689	2.38
215	Rehabilitation	Overnight	Neurological, motor 14-40	$8,344	3.49
216	Rehabilitation	Overnight	Spinal Cord Dysfunction, motor 81-91	$2,709	1.13
217	Rehabilitation	Overnight	Spinal Cord Dysfunction, motor 47-80	$7,635	3.19
218	Rehabilitation	Overnight	Spinal Cord Dysfunction, motor 14-46	$18,470	7.73
219	Rehabilitation	Overnight	Amputation of limb, motor 66-91	$5,069	2.12
220	Rehabilitation	Overnight	Amputation of limb, motor 47-65	$8,674	3.63
221	Rehabilitation	Overnight	Amputation of limb, motor 14-46	$9,915	4.15
222	Rehabilitation	Overnight	Pain Syndromes	$3,352	1.40
223	Rehabilitation	Overnight	Orthopaedic conditions, motor 74-91	$2,814	1.18
224	Rehabilitation	Overnight	Orthopaedic conditions, motor 58-73	$4,295	1.80
225	Rehabilitation	Overnight	Orthopaedic conditions, motor 52-57	$5,687	2.38
226	Rehabilitation	Overnight	Orthopaedic conditions, motor 14-51	$7,175	3.00
227	Rehabilitation	Overnight	Cardiac	$4,930	2.06
228	Rehabilitation	Overnight	Major Multiple Trauma	$7,031	2.94
229	Rehabilitation	Overnight	All other impairments, motor 67-91	$3,268	1.37
230	Rehabilitation	Overnight	All other impairments, motor 53-66	$4,562	1.91
231	Rehabilitation	Overnight	All other impairments, motor 25-52	$5,521	2.31
232	Rehabilitation	Overnight	All other impairments, motor 14-24	$7,861	3.29
251	Rehabilitation	Same Day	Brain, MMT & Pulmonary	$3,194	1.34
252	Rehabilitation	Same Day	Burns, Cardiac, Pain, Spine, & Neuro	$1,142	0.48
253	Rehabilitation	Same Day	All other impairments	$1,686	0.71

254	Rehabilitation	Outpatient & Community	Assess, Medical Only	$60	0.02
255	Rehabilitation	Outpatient & Community	Assess, Multidisciplinary	$198	0.08
256	Rehabilitation	Outpatient & Community	Treat, Medical Only	$61	0.03
257	Rehabilitation	Outpatient & Community	Amputation	$2,538	1.06
258	Rehabilitation	Outpatient & Community	Brain Injury and MMT	$1,496	0.63
259	Rehabilitation	Outpatient & Community	Spinal Injury	$543	0.23
260	Rehabilitation	Outpatient & Community	Stroke and DD, Sole Practitioner	$574	0.24
261	Rehabilitation	Outpatient & Community	Stroke and DD, Multidisciplinary, FIM Motor <=80	$1,116	0.47
262	Rehabilitation	Outpatient & Community	Stroke and DD, Multidisciplinary, FIM Motor >=81	$1,255	0.53
263	Rehabilitation	Outpatient & Community	All other impairments, Sole Practitioner	$433	0.18
264	Rehabilitation	Outpatient & Community	All other impairments, Multidisciplinary, FIM Motor <=80	$881	0.37
265	Rehabilitation	Outpatient & Community	All other impairments, Multidisciplinary, FIM Motor >=81	$651	0.27
301	Psychogeriatric	Overnight	HoNOS Overactive behaviour 4,5	$8,105	3.39
302	Psychogeriatric	Overnight	HoNOS Overactive behaviour 2,3, ADL 5	$7,602	3.18
303	Psychogeriatric	Overnight	HoNOS Overactive behaviour 2,3, ADL 1-4	$5,956	2.49
304	Psychogeriatric	Overnight	HoNOS Overactive behaviour 1, HoNOS total>=30	$6,163	2.58
305	Psychogeriatric	Overnight	HoNOS Overactive behaviour 1, HoNOS total<=29	$4,289	1.79
306	Psychogeriatric	Overnight	Long term care	$15,235	6.37
351	Psychogeriatric	Outpatient	Assessment Only	$191	0.08
352	Psychogeriatric	Community	Assessment Only	$106	0.04
353	Psychogeriatric	All ambulatory	Acute Phase	$425	0.18
354	Psychogeriatric	All ambulatory	All Other Phases, HoNOS total <=20	$91	0.04
355	Psychogeriatric	All ambulatory	All Other Phases, HoNOS total 21-25	$180	0.08
356	Psychogeriatric	All ambulatory	All Other, HoNOS total >=26, HoNOS Overactive 1,2	$357	0.15
357	Psychogeriatric	All ambulatory	All Other, HoNOS total >=26, HoNOS Overactive 3,4,5	$177	0.07
401	GEM	Overnight	Cognition<=15, motor 13-43	$5,068	2.12
402	GEM	Overnight	Cognition<=15, motor 44-91, age>=84	$4,775	2.00
403	GEM	Overnight	Cognition<=15, motor 44-91, age<=83	$3,006	1.26
404	GEM	Overnight	Cognition 16-35, motor 13-50	$3,790	1.59
405	GEM	Overnight	Cognition 16-35, motor 51-77	$3,166	1.32
406	GEM	Overnight	Cognition 16-35, motor 78-91	$2,115	0.88
451	GEM	Same Day	Assessment Only	$425	0.18
452	GEM	Outpatients & Community	Assess, Medical Only	$116	0.05
453	GEM	Outpatients & Community	Assess, Multidisciplinary	$195	0.08
454	GEM	Same Day	All Sameday	$1,716	0.72
455	GEM	Outpatients & Community	FIM Motor <=40	$886	0.37
456	GEM	Outpatients & Community	FIM Motor 41-56	$664	0.28
457	GEM	Outpatients & Community	FIM Motor>=57, Sole Practitioner	$528	0.22
458	GEM	Outpatients & Community	FIM Motor>=57, Multidisciplinary	$368	0.15
501	Maintenance	Overnight	Respite, RUG 15-18	$4,022	1.68
502	Maintenance	Overnight	Respite, RUG 5-14	$3,082	1.29
503	Maintenance	Overnight	Respite, RUG 4	$2,077	0.87
504	Maintenance	Overnight	Nursing Home Type, RUG 11-18	$4,780	2.00
505	Maintenance	Overnight	Nursing Home Type, RUG 4-10	$3,986	1.67
506	Maintenance	Overnight	Convalescent care	$2,003	0.84
507	Maintenance	Overnight	Other Maintenance, RUG 14-18	$2,532	1.06
508	Maintenance	Overnight	Other Maintenance, RUG 4-13	$4,236	1.77
509	Maintenance	Overnight	Long term care, RUG 17-18	$14,698	6.15
510	Maintenance	Overnight	Long term care, RUG 10-16	$12,943	5.42
511	Maintenance	Overnight	Long term care, RUG 4-9	$9,213	3.85
551	Maintenance	All ambulatory	Medical Only, all	$77	0.03
552	Maintenance	All ambulatory	Assess, Nursing	$157	0.07
553	Maintenance	All ambulatory	Assess, Psychosocial	$174	0.07
554	Maintenance	All ambulatory	Assess, Physical Therapy	$119	0.05
555	Maintenance	Same Day & Community	Assess, Multidisciplinary	$376	0.16
556	Maintenance	Outpatient	Assess, Multidisciplinary	$227	0.10
557	Maintenance	All ambulatory	Maintenance & Support, Nursing, age>=37, RUG>=5	$574	0.24
558	Maintenance	All ambulatory	Maintenance & Support, Nursing, age>=37, RUG 4	$529	0.22
559	Maintenance	All ambulatory	Maintenance & Support, Nursing, age<=36, RUG>=5	$646	0.27
560	Maintenance	All ambulatory	Maintenance & Support, Nursing, age<=36, RUG 4	$168	0.07
561	Maintenance	All ambulatory	Maintenance & Support, Physical Therapy, RUG>=6	$334	0.14
562	Maintenance	All ambulatory	Maintenance & Support, Physical Therapy, RUG 4,5	$279	0.12
563	Maintenance	Community	Maintenance & Support, Multidisc., age>=27, RUG 4-11	$882	0.37
564	Maintenance	All ambulatory	Maintenance & Support, Multidisc., age>=27, RUG>=12	$1,305	0.55
565	Maintenance	Outpatient	Maintenance & Support, Multidisc., age>=27, RUG 4-11	$542	0.23
566	Maintenance	All ambulatory	Maintenance & Support, Multidisc., <=26 yrs	$458	0.19
ALL EPISODES				$2,390	1.00

7 Discussion

7.1 Assessment of variance explanation

7.1.1 Overnight episodes

As described in Section 6.3, the AN-SNAP version 1 overnight classification explains 47.29% of the variation in cost in overnight episodes.

This result is considered to be satisfactory for the first version of the national classification and is sufficiently high to allow the classification to be used for both management and funding purposes.

In assessing the performance of AN-SNAP, the study team has reviewed its performance against three benchmarks:

- the FIM-FRG classification of inpatient rehabilitation episodes;
- the Australian National DRG classification (AN-DRG version 3); and
- previous studies in sub-acute and non-acute classification.

FIM-FRG

Version 1 of the FIM-FRG classification of inpatient rehabilitation episodes has 53 final classes. The natural logarithm of the length of stay (LOS) was used as the dependent variable[29]. The classification explained 31.3% of the variance after the removal of excluded cases (approximately 18% of all rehabilitation episodes) and outliers. The outlier threshold was three standard deviations from the Rehabilitation Impairment Code (RIC)-specific natural logarithm of the RIC-specific mean length of stay.

AN-DRGs

In the AN-DRG classification, episodes are partitioned into Major Diagnostic Categories and then further partitioned into medical (non-procedural) and surgical (procedural) classes. The classification is used to classify both overnight and same day cases. Length of stay is used as the dependent variable.

Recent research by Palmer et al[30] indicates that, after the exclusion of non-acute episodes and the removal of outliers, the AN-DRG classification explains 35.4% of variance in length of stay of overnight medical episodes. The upper outlier trimpoint was 1.5 times the Inter-Quartile Range (IQR) above the third quartile with a minimum IQR of 1. No lower trimpoint was employed. Approximately 11% of episodes were excluded prior to the calculation of variance explanation. The classification achieves much better variance explanation when surgical episodes and same day cases are included (50.83% with trimmed data).

Previous Australian Sub-Acute and Non-Acute Studies

Previous studies were summarised in Section 1. Two aimed to develop an episode classification. The Victorian Rehabilitation study[31] reported a variance reduction of 17% when length of stay was used as the dependent variable. The National Community Nursing Groups study[32] reported a variance reduction of 29% and employed cost per episode as the dependent variable.

All other studies have used cost per day as the dependent variable. The reported reduction in variance has ranged from 25% to 40%.

7.1.2 Ambulatory episodes

The AN-SNAP version 1 ambulatory classification explains 28.11% of the variation in cost in ambulatory episodes.

Given the exploratory nature of this side of the study, this result is considered to be satisfactory for the first version of the national classification. It suggests that the classification provides a viable structure for further development.

With the exception of palliative care, the statistical result is sufficiently high to allow it to be used for both management and funding purposes provided that there is a satisfactory transition period including the modelling and analysis of results at the agency level. The specific issues relevant to palliative care, and proposals for supplementary analysis, are discussed in Section 5.7.1 and Section 7.6.

A detailed discussion of the implications for all ambulatory care is included as Section 7.6.

7.2. Assessment of the Geriatric Evaluation and Management Case Type

One important task for the study was to determine whether the use of the 'Geriatric Evaluation and Management' Case Type could be supported by the data. This section provides an overview of the findings of this assessment and subsequent review of the data by the National Clinical Panel.

The current version of the National Health Data Dictionary[33] (NHDD) identifies six types of episodes for admitted patients. Geriatric Evaluation and Management is not included. The six existing types are:

- acute;
- rehabilitation;
- palliative care;
- non-acute care;
- unqualified neonate; and
- other care.

The view of the SNAP Clinical Panel was that episodes classified in the SNAP study as Geriatric Evaluation and Management would be variously classified under the NHDD definitions as either acute, rehabilitation or non-acute (maintenance) care. Geriatric Evaluation and Management episodes in the SNAP study were therefore compared with both Rehabilitation and Maintenance care episodes to assess whether there was any justification for the establishment of a separate Case Type.

Figure 192 shows some key comparative statistics for the three Case Types. On almost all key clinical indicators, the Geriatric Evaluation and Management profile was significantly different to that of either Rehabilitation or Maintenance. Patients classified to the Geriatric Evaluation and Management Case Type were, on average, 10 years older than either Rehabilitation or Maintenance. They were more likely to have cognitive problems (as indicated by scores on both the MMSE and the FIM Cognition sub-scale) and were more likely to have a non-specific impairment code. As a group, overnight Geriatric Evaluation and Management episodes showed less change in motor function from episode start to episode finish (whether measured by the FIM Motor sub-scale or the Barthel Index) than Rehabilitation episodes.

The episode profile for the three Case Types was also different. As a percentage of total Case Type, overnight episodes constituted 71% of Rehabilitation episodes, 36% of Geriatric Evaluation and Management episodes and 17% of Maintenance episodes. Over 40% of Geriatric Evaluation and Management episodes were for 'Assessment Only'. The majority of these episodes were provided by Aged Care Assessment Teams (ACAT). Over one third of maintenance episodes and one fifth of Geriatric Evaluation and Management did not involve a multidisciplinary team. These figures compare to 9% for Rehabilitation.

The reasons why episodes started were different. For overnight episodes, over 40% of both Geriatric Evaluation and Management and Maintenance episodes began with a direct admission from home. Only 14% of Rehabilitation episodes began this way. The majority (81%) of Rehabilitation episodes began with a transfer from another hospital or from acute care provided on a different ward in the same hospital. This figure compares to 40% for Geriatric Evaluation and Management and 35% for Maintenance. Most ambulatory episodes began with 'First contact following referral' - 62% for Rehabilitation, 91% for Geriatric Evaluation and Management and 69% for Maintenance. Episodes starting as a result of transfer from hospital constituted 24% of Rehabilitation, 3% of Geriatric Evaluation and Management and 14% of Maintenance episodes.

Figure 192 GEM, Rehabilitation and Maintenance - comparative statistics

	Rehabilitation	**GEM**	Maintenance
Mean Age	67.4	**79.3**	68.2
Overnight episodes as percentage of total Case Type	71	**36**	17
% of Case Type that is 'Assessment only'	5.3	**41.1**	15.4
% of episodes where care is provided by Sole Practitioner	9.3	**20.4**	36.3
% of overnight episodes where Reason for Episode Start is 'Admit from home / elsewhere'	14.2	**48.1**	45.1
% of overnight episodes where Reason for Episode Start is transfer from another hospital or transfer from acute care on a different ward of same hospital	81.0	**39.7**	34.7
% of overnight episodes where Reason for Episode End is 'Discharge to home /elsewhere'	78.0	**58.8**	43.8
% of overnight episodes where Reason for Episode End is 'Discharge to Nursing Home'	7.1	**20.4**	38.3
% of ambulatory episodes where Reason for Episode Start is 'First contact following referral'	61.5	**91.3**	68.7
% of ambulatory episodes where Reason for Episode Start is 'Transfer from hospital'	24.4	**3.0**	13.1
% of ambulatory episodes where Reason for Episode End is 'Discharge / case closure'	94.1	**81.6**	74.2
% of ambulatory episodes where Reason for Episode End is 'Transfer to Hospital'	3.5	**8.2**	16.4
% of episodes with MMSE score below 20 or not recorded for reasons other than 'other reason'	19.9	**31.8**	not collected
% of overnight episodes with impairment code of 'Pulmonary', 'Other Disabling Condition' or 'Debility'	8.9	**39.0**	not collected
Mean change in FIM Motor score from start to end of episode (overnight episodes)	11.6	**4.9**	not collected

The reasons why episodes ended were also different. 78% of overnight Rehabilitation episodes ended with the patient being discharged home. This compares to 59% for Geriatric Evaluation and Management and 44% for Maintenance. Only 7% of Rehabilitation episodes ended with the patient being transferred to a Nursing Home. This was significantly lower than either Geriatric Evaluation and Management (20%) or Maintenance (38%). Of the ambulatory episodes that ended during the study period, most did so due to 'Discharge / case closure' - 94% for Rehabilitation, 82% for Geriatric Evaluation and Management and 74% for Maintenance. Episodes ending as a result of transfer to hospital constituted 4% of Rehabilitation, 8% of Geriatric Evaluation and Management and 16% of Maintenance episodes.

The classification of patients to the GEM Case Type did not seem to be influenced by the facility or the jurisdiction in which the person was treated. GEM episodes (both overnight and ambulatory) occurred in all States and in New Zealand. GEM episodes occurred in the private sector although both the number and the percentage of GEM episodes were well below that of the public sector.

72% of overnight GEM episodes occurred in hospitals with a Level 3 rehabilitation service (see Appendix 12). This suggests that the study sites were not classifying patients based simply on the role of the facility. Sites with comprehensive rehabilitation services classified each individual episode as either rehabilitation or GEM. It appears that participating staff followed the study instructions and classified the patient rather than the stream of care/service/ward in which they worked.

Only 5% of overnight GEM episodes occurred in hospitals without a designated role in rehabilitation. 4 of the 104 participating sites had overnight GEM episodes but no overnight rehabilitation episodes (see Appendix 7). These 4 sites were all rural services.

Likewise, only 7% of ambulatory GEM episodes occurred in sites without a delineated role in rehabilitation. Consistent with the pattern of the overnight episodes, 69% of ambulatory GEM episodes occurred in sites with a Level 3 rehabilitation service. Again, it appears that the classification was based on characteristics of the person rather than on the stream of service.

In summary, the overall profile indicates that Geriatric Evaluation and Management episodes were sufficiently different to both Rehabilitation and to Maintenance to justify the incorporation of Geriatric Evaluation and Management as a separate Case Type. However, at the level of some specific impairments, the results were not as clear.

The number of Geriatric Evaluation and Management episodes in 6 of the 16 Functional Impairment Codes was too small to allow comparison. When comparing the 10 Functional Impairment Codes with sufficient volume to allow comparison, and testing for significance at the 0.05 level:

- There were 3 impairment groups (Neurological, Arthritis and Debility) where Geriatric Evaluation and Management episodes had significantly lower motor function scores at episode start and one (Brain Dysfunction) where Geriatric Evaluation and Management episodes had significantly higher motor function at episode start. There were 6 impairment groups where there was no difference between Rehabilitation and Geriatric Evaluation and Management (Stroke, Pain Syndromes, Orthopaedics, Cardiac, Pulmonary and Other Disabling Conditions).

- Geriatric Evaluation and Management episodes had lower cognitive function at episode start in all impairment categories. However, the difference was statistically significant in only 4 impairment codes (Brain Dysfunction, Arthritis, Pulmonary and Other Disabling Conditions).

- Geriatric Evaluation and Management episodes showed less change in motor function between episodes start and episode end (as measured by the FIM Motor score) in 9 of the 10 impairment groups (all but 'Pain Syndromes'). The difference was statistically significant for 6 impairment groups.

- Both Rehabilitation and Geriatric Evaluation and Management episodes showed small levels of

change in cognitive function as measured by the FIM Cognition score. The difference between Rehabilitation and Geriatric Evaluation and Management was significant for 9 of the 10 Functional Impairment Codes (all but 'Brain Dysfunction').

- There were significant differences between Rehabilitation and Geriatric Evaluation and Management with respect to core episode cost for 7 of the 10 Functional Impairment Codes (all but Stroke, Brain Dysfunction and Cardiac). These Functional Impairment Codes constituted 72% of all Geriatric Evaluation and Management episodes and 65% of all Rehabilitation episodes.

- There were no significant differences between Rehabilitation and Geriatric Evaluation and Management with respect to core episode cost for 3 of the 10 Functional Impairment Codes. For 2 of these 3 groups (Cardiac and Stroke) there were also no differences with respect to mean FIM Motor score, mean FIM Cognitive score or mean change in motor score from episode start to episode end. For these 2 impairment groups, the only statistically significant difference between Rehabilitation and Geriatric Evaluation and Management was in the mean change in cognitive function from episode start to episode end. These Functional Impairment Codes constituted 15% of all Geriatric Evaluation and Management episodes and 25% of all Rehabilitation episodes.

This last statistic is important. The overall profile of Rehabilitation and Geriatric Evaluation and Management was different. However, when standardised for impairment, the episode cost and the functional level of 15% of the overnight Geriatric Evaluation and Management episodes was no different to overnight Rehabilitation.

The data comparing Rehabilitation, Geriatric Evaluation and Management and Maintenance episodes were reviewed by the National Clinical Panel. After some debate, the Panel came to the view that Geriatric Evaluation and Management should be a separate Case Type in Version 1 of AN-SNAP and that the Geriatric Evaluation and Management Case Type should not be split into classes based on Functional Impairment. This view was based on the following considerations:

- From a clinical perspective it is desirable to have a consistent classification of Case Types across both overnight and ambulatory care;

- The experience of study sites demonstrates that clinicians can differentiate between Rehabilitation, Geriatric Evaluation and Management and Maintenance care based on characteristics of the person and the intention of treatment;

- Functional impairment is a rehabilitation concept and caution should be exercised when applying this paradigm to a group of patients for whom it was not intended;

- The separation of Geriatric Evaluation and Management in the first version of the classification allows for more case sensitive measures to be incorporated in subsequent versions of the classification.

On this basis, the Geriatric Evaluation and Management Case Type was incorporated into the AN-SNAP Version 1 classification.

7.3 Implications for Routine Data Collections for Admitted Patients

Implementation of any casemix classification requires that the variables used to assign an episode to a class are collected on a routine basis. Routine collection of the variables allows the classification to be progressively refined as larger data sets become available and as clinical practices change over time.

Implementation of the AN-SNAP classification requires two changes to routine data collections for admitted patients:

Same day admitted patient episodes

A same day admitted patient episode is defined in the AN-SNAP classification as a full sequence of same day patient visits. In contrast, the current national standard is that each individual day is classified as a same day admitted episode.

If the classification were to be applied within the current national definitions, the episode cost weight would need to be converted to a per diem cost weight. It would also be necessary to resolve whether the required data items would be collected on a daily basis rather than only once for the whole sequence of same day care.

Required Data Items

Only a few of the data items used in the SNAP classification are included in the current National Health Data Dictionary. Further, the required data items are not captured on a routine basis by State/Territory Health Authorities. Implementation of the classification would required the following additions / amendments to routine data collections:

1 Case Type

Five Case Types are included in the classification. The five Case Types are based on characteristics of the person and the intention of treatment. This is not a service or stream of care classification. Rather, implementation would require that the five Case Types as defined in Appendix 4 be collected on a routine basis. The National Health Data Dictionary already includes provision for the collection of 'Type of Episode of Care' (Item P21) and the current national standard allows for a change to occur from one Case Type to another. The only change required will be an amendment to the definitions.

2 Motor Function

A measure of motor function is included as an assignment variable for all Case Types. The measures used in the classification are:

- the RUG-ADL for Palliative Care and Maintenance episodes (2 digit);
- the FIM Motor Sub-Scale for Rehabilitation and Geriatric Evaluation and Management episodes (2 digit);
- the HoNOS ADL item for Psychogeriatric episodes (1 digit).

3 Cognitive function

A measure of cognitive function is included as an assignment variable for both Rehabilitation and Geriatric Evaluation and Management. The FIM Cognition Sub-Scale is used in the classification (2 digit).

4 Palliative Care Phase

Assignment to a palliative care class requires the collection of Palliative Care Phase (1 digit). Provision needs to be made for phase changes to be recorded within the one episode (up to 5 fields should be sufficient).

5 Functional Impairment Groups

Assignment to a rehabilitation class requires the collection of a 2 digit Functional Impairment Code. The UDS Functional Impairment Codes (version 4.0) are used in the classification. It is yet to be resolved whether they can be incorporated into ICD-10 or whether they can be mapped from ICD-10.

6 Health of the Nation Outcome Scale (HoNOS)

Assignment to a psychogeriatric class requires the collection of both the total HoNOS score (2 digit) and two of its individual items (each 1 digit).

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Given these additional data collection requirements, it would be sensible to review all data items currently being collected on sub-acute and non-acute episodes. It may be that some of the current items are redundant or irrelevant for these episodes. If so, there may be potential to implement the required data items without increasing the data collection and data entry burden for service providers and health information services.

7.4 Funding Models for Sub-Acute and Non-Acute Care

The purpose of this study was to develop a classification system for sub-acute and non-acute care, not to develop a funding model. However, in discussing the implications of the classification design, it is appropriate to identify funding issues and options, and to draw out recommendations on how such a system can be used.

The goal of the design of a casemix based funding model is to share risk between payers and providers fairly and to consider the types of incentives that are in the best interests of patients.

Funders are concerned to ensure that providers carry the risk for those factors that are within their control (eg efficiency). Providers are concerned that they are not forced to carry risk for factors outside their control (eg differences in severity or complexity between patients that are not adequately measured in the casemix classification).

To date, two casemix funding models have been dominant. Both models carry potential risks for patients. Episode payment models encourage technical efficiency. But they may also encourage inappropriate early discharge and selection of those patients less likely to have complex care needs. Per diem payment models do not encourage technical efficiency. When used in a capped funding environment, per diem funding models may serve to disadvantage patients awaiting care.

In 'episode' payment models, a payment rate is struck for each episode of care. Episode payment models typically include provision for payments for exceptional cases (outliers). Outlier payments do not begin until the episode exceeds the 'outlier threshold' or 'trim point'. In most per episode models, the trim point is determined by length of stay.

In this model, most risk is carried by providers. Providers may make large gains or losses. The risk is greater in sub-acute and non-acute care than in the acute care environment because of greater variation in the mean length of stay - the average length of stay in this study was 21 days for overnight patients compared to 4.8 days for acute overnight patients. By using existing methods to calculate outlier trim points, outlier payments may not begin for an exceptional case until the patient has been in care for some months. In the interim, the costs are borne by the provider.

Providers minimise their risks under this model by being technically efficient, by providing inadequate services (such as premature discharge) or by pre-selecting the least complex patients.

In 'per diem payment' models, a payment rate is struck for each day of care. Providers receive the payment for each day of care they provide. This is a fee for service model. Total payment to any provider may be capped but only if the funding agency caps the total number of days of care to be funded.

In an uncapped environment, the risk in this model is carried predominantly by funders. They carry the risk for providers who are technically inefficient and also for providers who have the most complex patients.

The risk is once again greater in sub-acute and non-acute care than in the acute care environment because of greater variation in the mean length of stay. In per diem funding models, funding agencies may need to provide funding over a substantial period of time.

The Mixed Per Diem/Per Episode Model

Consideration of how the classification system might be used suggests a third option for the funding of sub-acute and non-acute care. This is a mixed payment model whereby some payment components are episode-based and others are per diem. The episode payment is condition-specific and is related to the cost weight for the class to which the episode is assigned. The per diem

payment is standard across all sub-acute and non-acute care.

The episode payment can be defined as the case complexity payment for each class. It is affected by patient characteristics and the package of care provided to patients in each class.

The per diem payment is not affected by case complexity. It is a standard per diem payment designed to fund those components of care that are independent of case complexity.

The incentives created by such a model will be influenced by the proportion of funding that is included in the per diem payments and the proportion included in the case complexity payment. In consequence, careful consideration needs to be given to how to strike the per diem rate. In the initial implementation stages, the split will need to be based on the available data and the model should not be unnecessarily complex. The rate may then need to change over time as experience grows and as further data become available.

The case complexity payment is easily determined - it is based on the cost weight for each class. There are several ways to determine the size of the per diem payment. The recommended method is that it be based initially on the per diem costs of one of the AN-SNAP classes. The one overnight per diem rate should apply across all Case Types. Likewise, the one ambulatory rate should apply across all Case Types. The rationale for this approach is straightforward - costs which are specific to a Case Type should be included in the case-specific payment. Costs which are independent of case mix and case complexity should be included in the per diem payment. There may, in the longer term, be good reason to set different per diem rates for different Case Types although there is no reason to suggest that such an approach is required in the short-term.

The recommended benchmark for the per diem rate is the per diem cost of short-term respite maintenance care for patients with good motor function (Class 503 in AN-SNAP). The costs of this class are considered to be independent of case complexity in that they include hotel services, core nursing services and some basic therapy services. All patients in sub-acute and non-acute care receive these services irrespective of Case Type.

In the ambulatory classification, the benchmark class is Class 560. These costs are considered to be fixed in that they are, in essence, the cost of an ambulatory occasion of service irrespective of the characteristics of the client or the type of episode (same day, outpatient or community).

The idea of a mixed episode and per diem funding model is best illustrated by example. The example selected is the funding of stroke rehabilitation for overnight patients, but the model applies equally to other Case Types and to other Episode Types. In the following example, the final costs (see Appendix 14) have been used.

If this model were to be adopted for funding purposes, the actual figures would need to be adjusted to include any other adjustments considered necessary. This may include, for example, Territory-specific costs for the Northern Territory. The purpose of using the following figures is simply to illustrate the ideas.

The mean final episode cost for all overnight stroke rehabilitation in the study was $9,291. The mean length of stay was 26 days and the mean cost per day was $338. In contrast, the per diem cost of a short term respite patient with good motor function was approximately $200 per day.

Under the suggested funding model, payment for stroke would be split into two components:

- a daily payment of $200 for each day that the person is in care (irrespective of the length of stay), and

- a condition-specific episode payment. This is calculated as follows:

- take the average length of stay for the casemix class and multiply it by $200 per day. In the example, this is 26 days x $200 per day = $5,200

- subtract this amount from the core episode cost for the class. In the example, this is $9,291 - $5,200 = $4,091.

The condition-specific payment is an episode payment of $4,091.

Extending this example further, suppose there were 2 stroke rehabilitation patients; one stays in hospital for 20 days, the other for 46 days.

Payment under the mixed model would be as follows:

Patient 1 Length of stay = 20 days

This patient is funded at $8,091. It is made up as follows:

(1) Daily payment: 20 days x $200 = $4,000

(2) Condition-specific payment = $4,091

Total payment = $8,091

Patient 2 Length of stay = 46 days

This patient is funded at $13,291. It is made up as follows:

(1) Daily payment: 46 days x $200 = $9,200

(2) Condition-specific payment = $4,091

Total payment = $13,291

In contrast, payments under traditional per diem and per episode funding systems would be:

Patient 1 Per diem payment -
20 days x $338 (the mean for the class) = $6,760

Per episode payment -
1 episode x $9,291 (the mean for the class) = $9,291

Patient 2 Per diem payment -
46 days x $338 = $15,548

Per episode payment -
1 episode x $9,291= $9,291

This example is over-simplified because the recommended classification actually proposes 5 stroke rehabilitation classes as follows:

	Cost per episode	Average length of stay	Cost per day
Class 204	$5,921	18	$326
Class 205	$8,139	22	$371
Class 206	$8,561	27	$318
Class 207	$10,820	30	$360
Class 208	$15,111	42	$357

Under the mixed funding model, the payments for each of the 5 classes would be:

- Class 204 $200 per day plus $2,321 case complexity payment
- Class 205 $200 per day plus $3,739 case complexity payment
- Class 206 $200 per day plus $3,161 case complexity payment
- Class 207 $200 per day plus $4,820 case complexity payment
- Class 208 $200 per day plus $6,711 case complexity payment

One important feature of this model is illustrated by examining classes 205 and 206. On an episode basis, these classes have a similar cost ($422 an episode difference). But the average length of stay is 5 days longer for patients in Class 206. Patients in Class 205 cost more per day, presumably because they are receiving more therapy and care.

Under the mixed model, the episode payment is higher for patients in Class 205 than those in Class 206. However, given the differences in LOS, patients in Class 206 would receive more per diem funding than those in Class 205.

The mixed model represents middle ground that can be designed to more fairly share risk between providers and funding agencies. The per diem component minimises the risk for providers. The per episode component minimises the risk for payers.

In essence, the condition-specific episode payment funds those components of care that are related to the type and complexity of the case. Depending on individual need, therapy for an individual patient may be concentrated over a short period or extended over a longer period. The per diem payment essentially funds those components of care that are independent of case complexity. It is provided for whatever duration the patient is in care.

Short-stay patients

Any funding model that includes an element of episodic payment needs to consider how best to fund patients whose episodes are of exceptionally short duration. Such episodes are generally referred to as ‘short-stay outliers’.

There are several options and they are best illustrated by returning to the example of stroke rehabilitation. Suppose there was a third patient who stays in hospital for 4 days before being transferred to another facility or discharged to a nursing home.

Payment under the three models would be as follows:

Patient 3 Length of stay = 4 days

Per diem payment -
4 days x $338 (the mean for the class) = $1,352

Per episode payment -
1 episode x $9,291 (the mean for the class) = $9,291

Mixed episode/per diem payments -
4 days x $200 = $800
Plus 1 episode x $4,091 = $4,091
Total Payment = $4,891

The mixed episode/per diem model is clearly not appropriate for Patient 3. Neither is the episodic payment. For short stay outliers, the per diem funding model seems more appropriate.

If special provision is made for short-stay outliers, it will be necessary to determine the 'short-stay outlier trim point' - the point at which an episode is deemed to be short-stay. The suggested method is 'Low 2 (L2)' - the average length of stay divided by 2. Patients who stay less than half the average length of stay would be classified as short-stay patients and would be funded on a per diem basis. Patients who stay beyond that point would be funded under the mixed per diem / per episode funding model.

Long-stay patients

Special provision may also need to be made for patients whose episodes are of exceptionally long duration. Such episodes are generally referred to as 'long-stay outliers'. The options are again illustrated by reference to Stroke Rehabilitation.

Suppose there was a fourth stroke rehabilitation patient. Patient 4 stays in hospital for 90 days. Payments under the three models would be as follows:

Patient 4 Length of stay = 90 days

Per diem payment -
90 days x $338 (the mean for the class) = $30,420

Per episode payment -
1 episode x $9,291 (the mean for the class) = $ 9,291

Mixed episode/per diem payments -
90 days x $200 = $18,000
Plus 1 episode x $4,091 = $ 4,091
Total Payment = $22,091

There are two options for the funding of this patient. The first is to use one of the three models listed above. If so, the mixed model appears to again represent middle ground.

The second option is to reassess the patient at the point at which they become a long-stay outlier. The reassessment might result in the patient being re-assigned to their existing casemix class or, alternately, assigned to a new one. For example, Patient 4 might be assigned to their existing stroke rehabilitation class, to another stroke rehabilitation class, to a GEM class or to a Maintenance class.

In the case of this stroke patient, reassignment to their existing class could be contingent on a clinical review that demonstrated that the patient had further capacity for functional gain. Clinical guidelines and audit would be required if such a model were pursued.

If special provision is made for long-stay outliers, it would again be necessary to determine the 'trim point' - the point at which an episode is deemed to be long-stay. The suggested method is 'High 2 (H2)' - the average length of stay multiplied by 2. Patients who stay double the average length of stay would be re-assessed and a new 'episode' would begin.

Patient 4 would be re-assessed under this model at day 52. For payment purposes, the remaining 38 days would be regarded as a second episode.

'Ongoing' Patients

There is one further issue that arises from consideration of how the classification system might be used. There was a subset of patients in this study whose episodes of care extended over very long periods. They included spinal cord and brain injury patients (where a length of hospital stay of over one year was not uncommon) and patients awaiting placement (where the length of hospital stay was dependent on the availability of a nursing home or hostel bed).

In the ambulatory setting, they include community clients who required ongoing care in order to live independently in the community. For this group of patients, the basic concept of an 'episode of care' is problematic and, by extension, so is an 'episode payment'.

There appear to be three alternatives in addressing this problem. The first is to fund these patients on a per diem basis. The second is to treat these ongoing episodes as long-stay outliers. The third is to use the approach adopted in the design of this study and to pre-define a standard episode of care. Under this third approach, an episode of care for ongoing patients is pre-defined as, say, a period of three months irrespective of the average length of stay of the casemix class. It differs from the approach suggested for long-stay outliers only in that the period of review is standard and is not linked to the average length of stay of a specific casemix class.

At the end of each 3 month period, all ongoing patients are reassessed. At that point they might be re-assigned to their existing casemix class or assigned to a new one. At each review, a new 'episode payment' is made and the per diem payments continue. Like the long-stay outlier approach, this reassessment process could incorporate a process of clinical audit. This third approach has the advantage that it recognises that the needs of seemingly 'ongoing' patients can change over time. It is a more streamlined approach than a model that requires clinical review of different types of patients at different periods of time. Further, regular reassessments have been demonstrated, at least in the community setting, to reduce the cost of care[34].

However, if further analysis of the SNAP data base were to indicate that the pattern of cost of 'ongoing' patients remains relatively stable over time, the mixed per episode/per diem funding model would offer no advantages over per diem funding. Further analysis of the patterns of care of ongoing patients would be required before any conclusions on this issue could be drawn.

7.5 Implications for the classification and funding of overnight care

This section summarises the implications for the classification and funding for each of the five Case Types. Recommendations arising from this section are set out in Section 8.

7.5.1 Palliative Care

The AN-SNAP classification includes 11 classes for overnight palliative care. The classification was developed using the variables Type of Palliative Care Phase, the RUG-ADL at phase start and age. In the context of the funding models discussed in Section 7.3, the implications of this classification structure for palliative care are:

1 Of all of the Case Types, palliative care is perhaps the least appropriate for funding on an episode basis. Whilst it is inherently desirable that all health services are technically efficient, a focus on technical efficiency in palliative care runs the risk of creating perverse incentives. For somewhat obvious reasons, incentives to reduce length of stay (episode duration) may be inappropriate for this Case Type. On the other hand, it may be highly desirable to promote opportunities for service substitution between inpatient and community care.

2 The AN-SNAP classification of palliative care groups patients into classes based initially on their stage of illness. The dependent variable used to develop the classification was the cost of a palliative care phase rather than the cost of a palliative care episode. This structure was justified on both statistical and clinical grounds.

However, of all of the variables in the classification, phase is perhaps the one that is most susceptible to gaming (manipulation in order to receive a higher payment). Three inter-related strategies are suggested:

- the development of clinical standards for each of the 11 palliative care classes. This work would most appropriately be undertaken by the Australian Association for Hospice and Palliative Care (AAHPC).

- the routine capture of Reason for Phase End. It will be important to monitor the percentage of phases in each service that end because of:

  (a) the death of the patient;
  (b) discharge/case closure/transfer; and
  (c) change from one phase to another.

- the routine capture of the RUG-ADL at phase end for all phases that end other than by the death of the patient.

As a by-product, the development of standards for each class and the routine collection of these data items may allow for a refinement of the classes in the next version of the classification.

3 The distinction between bereavement support and bereavement counselling appears to be well understood. However, the results of the site survey reported in Section 3 suggest that there is little consistency in terms of funding for, and service policies on, the provision of bereavement support services. These results were supported by the data. Some services provide comprehensive bereavement support services, others provide almost none. In consequence, there would be little sense in a funding model which treated bereavement support simply as an overhead cost that is absorbed into other phases. As a strategy to

promote best practice, it would be appropriate to make agency-level funding for the Bereavement Phase contingent on an agreed set of policies, protocols and procedures.

4 A small subset of sites in this study provide palliative care to patients with AIDS. These patients require high cost drugs that have not been included in the costs for each phase. Such high cost drugs need to be separately funded.

5 There would be value in undertaking a supplementary analysis of the SNAP data set once it is linked to the discharge data sets of the participating sites. This supplementary analysis would investigate whether diagnosis (grouped simply into malignancy, non-malignancy and AIDS) acts as a useful explanatory variable within the classification.

7.5.2 Rehabilitation

The AN-SNAP classification includes 32 classes for overnight rehabilitation. The classification was developed using the FIM as the standard measure of function. In the context of the funding models discussed in Section 7.3, the implications of this classification structure for rehabilitation care are:

1 Until such time as the Minimum Data Set for Rehabilitation is completed and a standard measure of function is agreed, it can be anticipated that clinicians will continue to use both the FIM and the Barthel Index.

One branch of the rehabilitation classification makes use of the FIM Cognition Sub-Scale. This branch is used to assign both stroke and burns episodes to one of five classes. No other branches require the use of the FIM Cognition Sub-Scale.

An important implication of this classification system design is that stroke and burns episodes can only be assigned to a rehabilitation class if they are assessed by use of the FIM. The Barthel Index was successfully mapped to the FIM Motor sub-scale for the purposes of the study and the Barthel Index episodes were included in the data set used to create the classification. However, Stroke and Burns episodes with Barthel scores had to be excluded from the final classes.

2 3 of the 32 rehabilitation classes have a long length of stay - Class 202 (Brain Injury, Neurological, Spinal Injury and Major Multiple Trauma with FIM Motor = 13); Class 212 (Brain Injury, FIM Motor = 14-28) and Class 218 (Spinal Injury, FIM Motor = 14-46). For patients in these classes, per diem funding seems appropriate at least until such time as further analysis of the SNAP data base is undertaken. This analysis needs to focus on assessing the long-term care patterns of the patients in these classes. This will possible with the existing data set because it includes patients at varying points through the rehabilitation process. Each day of care is numbered based on the number of days since the episode start date and each day has been separately costed.

3 For the remaining 29 classes, the mixed per diem / per episode funding seems to be appropriate.

4 There is a small proportion of rehabilitation episodes that are clearly exceptional cases. One specific group are long-term ventilator-dependent spinal injury patients. The volume of these episodes was not sufficient in this study to determine their costs with any confidence. These patients need to be funded on a case by case basis.

5 Further work is required on the Burns Rehabilitation episodes. There were only 9 Burns Rehabilitation episodes in this study and, on clinical advice, they were incorporated in with Stroke Rehabilitation. A review of the cost patterns of these 9 episodes confirmed that their

profiles were similar to the Stroke Rehabilitation episodes. However, a further review of Burns Rehabilitation will be required in the future when all of the required assignment variables have been collected for a sufficiently long period to allow for a larger data base and a more reliable analysis.

6 Likewise, consideration needs to be given in the next version of the classification to the creation of separate classes for Pulmonary Rehabilitation. In this first version of the classification, Pulmonary Rehabilitation has been incorporated in “All Other Impairments”.

7 There is one class (Class 22) for rehabilitation for Pain Syndromes. Like each of the other AN-SNAP classes, clinical protocols need to be developed for this class. Clinical protocols for those impairments not defined by function would assist in more clearly defining these groups.

8 The copyright for the FIM is held by the Uniform Data System for Medical Rehabilitation, State University of New York, Buffulo, USA and accredited FIM training is required before it can be used. NSW and Victoria are the only States to have sufficient accredited FIM trainers to provide the required training. The issue of FIM training needs to be addressed by the Commonwealth, the States/Territories, the Faculty of Rehabilitation Medicine, The Australian Society for Geriatric Medicine, the relevant allied health and nursing associations and relevant academic institutions.

9 The FIM Discharge score was not a strong predictor of cost. It is a recognised measure of functional gain for overnight rehabilitation (but not ambulatory rehabilitation) and may have a useful role in the clinical review processes discussed in the previous section on funding models.

10 The AN-SNAP classification is a classification of patients and not of streams of care. Patients assigned to the Rehabilitation Case Type are managed by Rehabilitation Medicine, by Geriatric Medicine and by a number of other clinical sub-specialties. Likewise, patients assigned to the Geriatric Evaluation and Management Case Type are managed by both Rehabilitation Medicine and by Geriatric Medicine.

One important implication of this classification structure is that some negotiation will be required as more case sensitive measures are developed for the GEM episodes (see Section 7.5.4). Any future measures developed for GEM episodes will need to be suitable for both rehabilitation and geriatric medicine units.

7.5.3 Psychogeriatric Care

The AN-SNAP classification includes 5 classes for short-term psychogeriatric care and one class for ongoing care. The classification was developed after 10 extremely high cost outliers were excluded from the data set. A critical issue for this group is that it consists of a low volume of episodes. It is tempting to argue that, in consequence, the classification is unstable and that further work is required. However, the low volume of episodes in the study reflects the low volume of episodes in the aged care system. Further work is required but this will not resolve the inherent difficulties in developing a sensible classification structure for this low volume, high cost group. In the context of the funding models discussed in Section 7.3, the implications of the classification structure for psychogeriatric care are:

1 Episodes are initially classified to one of the five short-term classes. Assignment to one of these classes is based on the HoNOS.

2 For patients in these 5 short-term care classes, the mixed per diem/ per episode funding model seems to be appropriate.

3 With few exceptions, patients still in care at the high trim point (H2 or double the length of stay for each class) would be reassigned to Class 306 (the ongoing care class).

4 For patients in Class 306, per diem funding seems to be the most appropriate.

5 There is a small proportion of Psychogeriatric episodes that are clearly exceptional cases. They were represented in this study by the 10 extremely high cost outliers who were excluded from the data set prior to class finding. Each of these patient episodes were reviewed on a case by case basis and their costs were found to be correct. They were not a homogeneous group - they would be scattered throughout all classes if included in the classification. These episodes had per diem costs that were similar to the per diem costs of the short-term classes. However, each was a long-term episode.

   Provision needs to be made for the funding of such exceptional cases. The logical approach is the establishment of an approval mechanism that allows such episodes to be reassigned to the appropriate short-term class rather than moving automatically to the long-term class. Such an approval mechanism could be contingent on an agreed process of clinical review.

6 Some psychogeriatric patients receive care in geriatric medicine units. One important implication of the classification design is that clinicians in geriatric medicine will require training in the use of the HoNOS if their patients are to be assigned to one of the psychogeriatric classes. This implication is fundamental to the design of the AN-SNAP classification - AN-SNAP is designed to classify the patient rather than the stream of care in which they are treated.

Psychogeriatric care is provided both within an aged care framework and within a mental health framework. The National Mental Health Classification and Services Cost project (MH-CASC), which is currently in progress, has included psychogeriatric care provided within specialist mental health services whilst the SNAP study has focussed on psychogeriatric care provided more within aged care services. Once the MH-CASC study is completed, consideration needs to be given to the amalgamation of the two psychogeriatric data sets so that further analysis can be undertaken. It will be important to determine whether the clinical profiles and patterns of care of the two cohorts are similar or different. It will also be important to determine whether the AN-SNAP and the MH-CASC classifications should have common psychogeriatric classes in subsequent versions.

7.5.4 Geriatric Evaluation and Management

The AN-SNAP classification includes 6 classes for overnight Geriatric Evaluation and Management. The classification was developed using the FIM as the standard measure of function. Cognitive function proved to be an important cost driver for this group and, due to non-compliance with the MMSE, it was not able to be tested. The FIM Cognition Sub-Scale proved to be a good predictor of costs.

The design of the data set for this study focussed on testing whether any difference existed between Rehabilitation and GEM episodes. In consequence, variables such as Functional Impairment Code were collected on the GEM episodes.

One consequence of this design decision was that there was less focus on the use of measures which may be more sensitive in discriminating between episodes within the GEM Case Type. In the event, GEM proved to be the most homogeneous of the five Case Types.

In the context of the funding models discussed in Section 7.3, the implications of this classification structure for Geriatric Evaluation and Management are:

1 Assignment to the 6 GEM classes requires the use of both the FIM Cognition Sub-Scale and the FIM Motor Sub-Scale. For services not using the FIM, assignment to a GEM class will not be possible until such time as a measure of cognition is identified / developed that meets clinical need and which can be successfully mapped to the FIM Cognition Sub-Scale. Like the measurement of motor function, there is no consensus on the most appropriate measure of cognitive function.

2 More case sensitive measures for GEM episodes could then be incorporated into subsequent versions of the classification.

3 The GEM Case Type is sufficiently homogeneous that all episodes could be funded as one class pending the development of more case sensitive measures. The mixed per episode / per diem model would seem to be appropriate.

4 The AN-SNAP classification is a classification of patients and not of streams of care. Patients assigned to the Geriatric Evaluation and Management Case Type are managed by both Geriatric Medicine and by Rehabilitation Medicine as well as by general physicians and, in some instances, general practitioners. Likewise, patients assigned to the Rehabilitation Case Type are managed by Rehabilitation Medicine, by Geriatric Medicine, and by a number of other clinical specialities.

One important implication of this classification structure is that some negotiation will be required on the matter of functional measurement. Rehabilitation and GEM patients are frequently treated on the one ward and by the same team of providers. Practical difficulties will arise if future versions of the classification require that the same underlying dimensions (motor and cognitive function) need to be measured using 2 different instruments. In consequence, the major focus of future work needs to be on the mapping of the various measurement instruments.

7.5.5 Maintenance Care

The AN-SNAP classification includes 11 classes for overnight maintenance care. The classification was developed using the RUG-ADL as the standard measure of function. In the context of the funding models discussed in Section 7.3, the implications of this classification structure for maintenance care are:

1 Maintenance care is frequently regarded as being synonymous with nursing home care. This view is not supported by the data. Many of the classes have costs that are significantly higher than nursing home payment rates. Several of the high cost maintenance classes are similar in cost to some of the Rehabilitation and GEM classes.

2 The classification makes use of the variable Type of Maintenance Care (Respite, Convalescent, Nursing Home Type and Other). The definitions used in the study were based on the types of ‘Non-acute care’ as defined in the National Health Data Dictionary. The National Health Data Dictionary has one class called ‘Non-acute’ and another called ‘Other’.

Type of Maintenance Care proved to be predictive of cost. However, all definitions with the exception of ‘Respite Care’ require refinement to allow for more consistent application.

The definition of Nursing Home Type (NHT) is not based on whether the person is awaiting nursing home placement. Instead, it is based on length of stay (greater than 35 days) and the absence of an ‘acute care certificate’ issued under the 1973 Health Insurance Act. Patients without an ‘acute care certificate’ are required to make a financial contribution to their hospital

costs as if they were resident in a nursing home. For both casemix and service planning purposes, it would be useful to distinguish between those patients who are awaiting nursing home placement, those who are receiving convalescent care and other NHT patients. A significant proportion of the NHT patients in this study were discharged to home (and not to a nursing home).

There were 60 short-term "Other Maintenance" episodes. They were of significantly higher cost than other Maintenance patients. Separate classes for this group have been established in this first version of the classification. A review of the facility codes for these episodes indicated that most received care in hospitals that provide specialist spinal injury, brain injury and other sub-speciality services. Unless a definition of 'Other Maintenance' can be developed based on diagnostic data from hospital morbidity collections, this Type of Maintenance Care should be excluded from future versions of the classification. It makes no sense to define a high cost casemix class based on a default definition. In the interim, an approval process would be required if the classes are be allowed for payment purposes.

3 The results of the study demonstrate that short-term maintenance episodes are significantly more expensive on a per diem basis than ongoing episodes. Under the funding model suggested in Section 7.4, episodes are initially classified to one of the 8 short-term classes.

4 With few exceptions, patients still in care at the high trim point (H2 or double the length of stay for each class) would be reassigned to one of the ongoing care classes. For patients in the ongoing care classes, per diem funding seems to be the most appropriate.

5 Like psychogeriatrics, provision needs to be made for the funding of exceptional long-term cases. Again, the logical approach is the establishment of an approval mechanism that allows such episodes to be reassigned to the appropriate short-term class rather than moving automatically to the long-term class. Such an approval mechanism could be contingent on an agreed process of clinical review.

6 Whilst patients in the ongoing care classes were less costly than those in the short-term classes, there are significant differences in cost within the long-term group. The RUG-ADL proved to be a good predictor of costs within the long-term group. As already noted, most of the long-term care episodes had per diem costs that were significantly higher than current nursing home payment rates.

7.6 Implications for data collection, classification and funding of ambulatory care

This section begins by a discussion of issues which are common to all sub-acute and non-acute ambulatory care. It then moves on to discuss the implications for each Case Type.

7.6.1 Data issues and collections

There is no national minimum data set for ambulatory care although progress is now being made through the National Institution Based Ambulatory Modelling (NIBAM) project and the Community Health Information Management Enterprise (CHIME) project. Different jurisdictions currently have different data standards and approaches and many agencies employ locally designed systems and locally defined data items.

Implementation of the AN-SNAP ambulatory classification will require that the variables used to assign an episode to a class be collected on a routine basis. Routine collection of the variables will allow the classification to be progressively refined as larger data sets become available and as clinical practices change over time. One important prerequisite of routine use of the classification is that the required data items are incorporated into the NIBAM and CHIME projects. The same data items are required across both institutional and community based ambulatory care.

Data Items Employed in the Classification

Implementation of the classification would require that the following information be collected:

Case Type

Five Case Types are included in the classification. The five Case Types are based on characteristics of the person and the intention of treatment and are defined in Appendix 4.

For the purposes of the study, it was also necessary to define the boundary between primary / acute / post-acute care and the sub-acute and non-acute care that was in scope for the classification.

Post-acute care was defined as being that short-term care provided to a person immediately following an acute illness or injury. The services that the person receives are an extension of those provided during the acute period and the goal of care is to restore the person to their pre-acute level of health and function. For the purposes of the study, post-acute care was defined as care with an expected duration of less than 4 weeks.

Post-acute care was outside the boundary of the SNAP study but was defined using the same format as the five SNAP Case Types:

An episode of care:

- provided for a person who, following an acute illness or injury, requires time-limited intervention and
- for whom the primary treatment goal is restoration of the person's pre-acute level of health and function within a short time frame
- which is evidenced by a care plan that includes an indicative time frame of 4 weeks or less.

Inclusions:

A post-acute care provided in both community and outpatient settings
B post-acute interventions such as the following examples:
- + clip/suture removal
- + wound care/dressings
- + assistance with and/or education about injections and self-medication
- + post-acute therapy including physiotherapy and speech therapy
- + assistance with personal care
- + simple home modifications

The interventions provided to post-acute and maintenance clients are often the same. The key differences are the primary goal and the expected duration of care. In post-acute care, the primary goal is restoration of previous health and function leading to care closure within a matter of weeks. In maintenance care, the primary goal is maintenance of current health and function if possible and there is no short-term expectation of case closure.

Assessment only

A significant percentage of both outpatient and community care was for “Assessment Only”. “Assessment Only” episodes were defined as those in which the person was seen on one occasion only for assessment and/or treatment and no further intervention by the service/team was planned. The Study Manual instructed sites that, if a person was booked for subsequent treatment, the episode was not “Assessment Only”. If a person was booked for subsequent assessment (but not treatment), they were classified as “Assessment Only”. Thus, “Assessment Only” episodes were defined to include one-off treatment provided during an assessment and also an assessment that took place over more than one day.

Episode Type

Three Episode Types are included in the ambulatory classification and, in some branches, the type of episode is used as a classification variable. The three Episode Types are:

- Same day admitted;
- Outpatient;
- Community client.

Provider Type

Several branches of the classification are defined by type of provider. In some cases, the split is solely into ‘Sole Practitioner’ versus ‘Not Sole Practitioner’. In other branches, a more detailed approach was developed. In these cases, the rule for defining the class was the same.

Five types of Provider class were defined:

- Nursing (care provided solely or predominantly by enrolled and/or registered nurses)
- Psychosocial (care provided solely or predominantly by social workers, psychologists, Aboriginal health workers, or chaplains);
- Physical Therapy (care provided solely or predominantly by physiotherapists, occupational therapists, speech pathologists or therapy aids);
- Medical (care provided solely or predominantly by doctors);
- Multidisciplinary (multidisciplinary or inter-disciplinary care provided by a team of providers including care provided by all other designations).

One class within the palliative care branch (Class 152) combines the Psychosocial and Physical Therapy groups together as a 'Therapy Only' class.

Age

Age of the client is used as a variable in several branches of the classification.

Case Specific Data Items

In addition to the above generic items, some items are required that are specific to one or more Case Types. They are:

< Motor Function

A measure of motor function is included as an assignment variable for all Case Types except Psychogeriatric. The measures used in the classification are:

C the RUG-ADL for Palliative Care and Maintenance episodes (2 digit)

C the FIM Motor Sub-Scale for Rehabilitation and Geriatric Evaluation and Management episodes (2 digit)

< Palliative Care Phase

Assignment to a palliative care class requires the collection of Palliative Care Phase (1 digit). Provision needs to be made for phase changes to be recorded within the one episode (up to 5 fields should be sufficient).

< Palliative Care Severity

Assignment to a palliative care class requires the collection of the Palliative Severity Scale (2 digits). Provision needs to be made for a severity score to be recorded for each phase.

< Functional Impairment Groups

Assignment to a rehabilitation class requires the collection of a 2 digit Functional Impairment Code. The UDS Functional Impairment Codes (version 4.0) are used in the classification. It is yet to be resolved whether they can be incorporated into ICD-10 or whether they can be mapped from ICD-10.

< Health of the Nation Outcome Scale (HoNOS)

Assignment to a psychogeriatric class requires the collection of both the total HoNOS score (2 digit) and one of its individual items (1 digit).

< Psychogeriatric phase

This variable is used to assign a psychogeriatric episode to a class. It is defined on page 91 of this report (1 digit).

7.6.2 Data Items for testing in subsequent versions of the Classification

Several instruments and data items need to be developed and tested for future versions of the classification. They are:

A. A measure of motor function that is appropriate for routine application in a community setting

This study employed the FIM for both Rehabilitation and Geriatric Evaluation and Management and the RUG-ADL for Palliative Care, Psychogeriatrics and Maintenance. The SNAP Clinical Panel agreed that, in the absence of a measure designed specifically for use in the ambulatory setting, the FIM was appropriate for incorporation in the classification. The RUG-ADL is easy to use, acceptable to community providers and requires minimal training. However, it has only 4 items and 4 levels and lacks sensitivity. The majority of the ambulatory maintenance episodes had a RUG-ADL score of 4.

There are no existing tools that are better for the task and, pending the development of an improved tool, both the FIM and the RUG-ADL are recommended for routine use. Any new measurement instrument will need to be quick to use in the ambulatory setting, require minimal observation, have sufficient sensitivity to discriminate between the motor capacity of ambulatory clients, be useful for clinical assessment and be demonstrated to be predictive of cost. Given these requirements, it may be some time before a better tool is developed that can satisfactorily replace the FIM and the RUG-ADL.

B. Availability of Carer

Consultation with clinicians suggests that carer availability influences the type of services that are provided and therefore affects resource consumption. If this item is to be captured, it will not be sufficient to simply ask whether the person lives alone. The key issue is whether the client has a carer who is both willing and capable of undertaking tasks that would otherwise be undertaken by a health professional.

C. Usage of other health and community services by community clients

Community clients frequently receive services from more than one agency and patterns of multiple service usage may confound the results of any single client mix classification. If work proceeds on this issue, it will be important to determine if the attribute to be captured is the number of other services, the adequacy of services or the degree to which services are substitutable.

D. Instrumental ADLs (eg. medication management; food preparation etc.)

The issue of the sensitivity of measures of motor function was raised above. A further issue is that, regardless of sensitivity, self-care Activities of Daily Living scales (whether measured by the RUG-ADL, Barthel or FIM) may not be sufficient measures for use in a community setting. There are several existing instrumental scales but little consensus on which is the best to use.

E. Items that discriminate between 'Assessment Only' episodes and Treatment episodes

The results from this study indicate that one-off and short-term assessment and/or treatment constitutes a significant proportion of ambulatory care. Further versions of the classification need to give attention to effective ways of discriminating between these episodes.

7.6.3 Implications of the statistical results

The objectives of this study included the development of definitive cost weights for overnight episodes and the development of preliminary cost weights for any other episodes where a more definitive result could not be justified by the data collected in this study. It was also to test whether the five Case Types were appropriate for the ambulatory setting and to test whether the client attributes which best predict resource consumption in the inpatient setting were also predictive of costs in the ambulatory setting.

The statistical result for the overnight episodes was better than that for the ambulatory episodes. This had been expected for several reasons. First, considerable developmental work had already been undertaken in the inpatient setting that could be used to guide the study design. Second, of the limited work that has been undertaken to date, most has been based on the premise that any classification would use the cost of an occasion of service or a day of care as the dependent variable. In contrast, the cost of an episode was the dependent variable in this study. Third, as already noted, few of the available measurement instruments were designed for use in ambulatory care. Fourth, ambulatory care is inherently more complex than institutional care. The inpatient environment is much more controlled in that key decisions driving resource consumption are generally under the control of the care provider. A range of other factors are important cost drivers in ambulatory care. They include client preferences, the availability of substitutable services and the availability of carers.

Several conclusions can be drawn from the results of this study:

- the variables driving costs in the inpatient setting are also important cost drivers in the ambulatory setting. Most variables used in the classification are common to both the overnight classes and the ambulatory classes. However, there are other factors at play in the ambulatory setting. Common variables across the two settings are necessary but insufficient - they need to be supplemented by measures designed specifically to discriminate within ambulatory care.

- as already discussed, there is a need to develop measurement instruments that are sensitive in the ambulatory setting.

- with the exception of palliative care, the classes and the weights developed in this version of the classification can be used for funding provided that there is a satisfactory transition period including the modelling and analysis of the results at the agency level. The costs for each class are for both complete episodes and for three months of care for ongoing episodes. The blended per diem/per episode payment model seems to be appropriate with the per diem rate pegged to Class 560 (core and medical cost total of $33 per day in this study).

- the blended per diem/per episode payment model is not recommended at this stage for ambulatory palliative care. The per diem costs and weights developed in this version of the classification could be used for funding palliative care services provided that there was a satisfactory transition period including the modelling and analysis of the results at the agency level.

- agencies funded under the classification would also need to be funded for their work which is not included within the scope of the classification. This would include teaching, research and health promotion. Whilst there was variation between community sites, between 60% and 80% of the work of most community health sites was covered by the classes in the AN-SNAP classification.

- there would need to be a funding mechanism for the funding of exceptional cases and for the funding of high cost medical and surgical supplies and equipment. 36 high cost outliers were removed from the ambulatory data set prior to analysis because more than 90% of the total episode cost was in the cost of an item of equipment. The equipment cost for these episodes ranged from $1,500 to $10,000. Likewise, there were 40 maintenance care episodes that had medical and surgical supply costs of greater than $500.

7.6.4 Same day, outpatient and community care

Whilst the cost of these three types of episode were different within some branches, there were many other instances where there was no significant difference in episode or per diem cost. It may be that these episodes have different cost structures in that institutional ambulatory care has higher overhead costs and community ambulatory care has higher travel costs. However, these differences appear to net off in many branches of the classification.

7.6.5 Opportunities for service substitution

The results of this study suggest that the majority of patients being treated in the overnight setting have different clinical profiles to those treated in the ambulatory setting. For example, the mean FIM score was significantly lower in the inpatient setting. Nevertheless, there was also a significant group of episodes that had a similar profile across both overnight and ambulatory care. For example, two classes were created within the ambulatory GEM branch for clients with a FIM Motor score of less than 57.

These results suggest that, at least in some cases, there are opportunities to use the classification to promote service substitution between overnight care, institutional ambulatory care and community-based ambulatory care.

7.6.6 Classification structure and future development

The emphasis in this first version of the classification was on the establishment of a sensible classification structure. Some decisions made during the development process were based simply on this requirement, even if this lowered the statistical performance. For example, a class was created within the rehabilitation branch for spinal injury rehabilitation when the data supported bundling these episodes in with 10 other impairment groups.

The resultant structure is considered to be a sound basis for further development. It distinguishes between sole practitioner and multidisciplinary care and, with the use of Case Type, is driven by the characteristics of the client and the goal of intervention. Specific client attributes were included when supported by the data. These included type of impairment, stage of illness, measures of function, age and severity.

The results suggest that the focus of future work needs to be on:

- the development of more sensitive measurement instruments;
- analysis of a subset of the palliative care sites in order to control for the influence of ‘shared-care’ arrangements and, if necessary, to develop an alternative model based on a per diem classification;
- the refinement of the lower branches in the rest of the classification;

- an expansion of scope to include the acute / post-acute and primary care provided by community health providers;

- training and education in the community care sector about the concept of classification and about how the classification can be applied for both management and funding purposes. Consultation with sites suggests that the term 'casemix' is not acceptable and is poorly understood. Whilst perennial debates continue about the use of the terms 'patient' and 'client', it appears that the concept of 'client mix' is generally acceptable to the community sector; and

- the identification of the relationship with, and boundary between, classification development in health, HACC and other community care.

7.6.7 Implications for each Case Type

This sections highlights those issues that are specific to each Case Type. Issues of relevance across Case Types were discussed above.

7.6.7.1 Palliative Care

The AN-SNAP classification includes 22 classes for ambulatory palliative care. The classification was developed using the variables Provider Type, Type of Palliative Care Phase, the RUG-ADL at phase start, the Palliative Care Severity scale and age. In the context of the funding models discussed in Section 7.3, the implications of this classification structure for ambulatory palliative care are:

1. The blended per diem/per episode payment model is not recommended at this stage for ambulatory palliative care. The per diem costs and weights developed in this version of the classification could be used for funding palliative care services provided that there was a satisfactory transition period including the modelling and analysis of the results at the agency level. This may promote opportunities for service substitution between inpatient and community care.

2. Provision would need to be made for the funding of exceptional cases. For palliative care episodes, these were predominantly the result of the cost of high cost medical and surgical supplies or expensive equipment. These costs are best funded outside a classification funding model.

3. A small subset of sites in this study provide palliative care to patients with AIDS. These patients require high cost drugs that have not been included in the costs for each phase. Such high cost drugs need to be separately funded.

4. The AN-SNAP classification of ambulatory palliative care groups patients into classes based initially on the Provider Type and then on their stage of illness. The use of the variable Provider Type is not desirable in a casemix classification. However, it should remain in the classification until such time as another method can be found to take account of usage of other health and community services by community clients.

5. As with the overnight classification, usage is made of the variable Phase and the same set of strategies are proposed to monitor whether there is manipulation of this variable. Three inter-related strategies are suggested:

    - the development of clinical standards for each of the palliative care classes. This work would most appropriately be undertaken by the Australian Association for Hospice and Palliative Care (AAHPC).

- the routine capture of Reason for Phase End. It will be important to monitor the percentage of phases in each service that end because of:

  (a) the death of the patient
  (b) discharge/case closure/transfer and
  (c) change from one phase to another

- the routine capture of the RUG-ADL at phase end for all phases that end other than by the death of the patient.

As a by-product, the development of standards for each class and the routine collection of these data items may allow for a refinement of the classes in the next version of the classification.

6 As with the overnight palliative care, the distinction between bereavement support and bereavement counselling appears to be well understood. However, the results of the site survey reported in Section 3 apply equally to ambulatory palliative care. It appears that there is little consistency in terms of funding for, and service policies on, the provision of bereavement support services. These results were supported by the data. Some services provide comprehensive bereavement support services, others provide almost none. In consequence, there would be little sense in a funding model which treated bereavement support simply as an overhead cost that is absorbed into other phases. As a strategy to promote best practice, it would be appropriate to make agency-level funding for the Bereavement Phase contingent on an agreed set of policies, protocols and procedures.

7 There would be value in undertaking a supplementary analysis of the SNAP data set using only the data from those sites known to provide a comprehensive service. This analysis should focus on controlling for the influence of 'shared-care' arrangements. If necessary, it should develop an alternative model based on a per diem classification.

7.6.7.2 Rehabilitation

The AN-SNAP classification includes 15 classes for ambulatory rehabilitation. The classification was developed using the FIM as the standard measure of function. In the context of the funding models discussed in Section 7.3, the implications of this classification structure for rehabilitation care are:

1 Until such time as the Minimum Data Set for Rehabilitation is completed and a standard measure of function is agreed, it can be anticipated that clinicians will continue to use both the FIM and the Barthel Index. The Barthel Index was successfully mapped to the FIM Motor sub-scale for the purposes of the study and the Barthel Index episodes were included in the data set used to create the classification. There would be no reason why Barthel episodes could not continue to be mapped to the FIM for the purposes of implementing the classification.

2 The mixed per diem / per episode funding seems to be appropriate.

3 There are a small proportion of rehabilitation episodes that are clearly exceptional cases. Like the overnight episodes, they include long-term ventilator-dependent spinal injury patients who are living at home. The volume of these ambulatory episodes was not sufficient in this study to determine their costs with any confidence. These patients need to be funded on a case by case basis.

4 Consideration needs to be given in the next version of the classification to the creation of separate classes for additional impairment groups. This could be possible with a larger data set that has been collected on a routine basis.

5 The copyright for the FIM is held by the Uniform Data System for Medical Rehabilitation, State University of New York, Buffulo, USA and accredited FIM training is required before it can be used. NSW and Victoria are the only States to have sufficient accredited FIM trainers to provide the required training. The issue of FIM training needs to be addressed by the Commonwealth, the States/Territories, the Faculty of Rehabilitation Medicine, The Australian Society for Geriatric Medicine, the relevant allied health and nursing associations and the universities.

6 The FIM Discharge score need not be collected. It was not a strong predictor of cost and is not a good measure of functional gain in the ambulatory setting.

7 The spinal injury class is very heterogeneous. Consideration should be given to splitting this group based on the FIM Motor Sub-Scale when more data are available. Likewise, consideration needs to be given to splitting the brain injury and major multiple trauma class when more data become available.

7.6.7.3 Psychogeriatric Care

The AN-SNAP classification includes 5 treatment classes and 2 assessment classes. Like the overnight episodes, a critical issue for this group is that it consists of a low volume of episodes. It is again tempting to argue that, in consequence, the classification is unstable and that further work is required. However, the low volume of episodes in the study again reflects the low volume of episodes in the aged care system. Further work is required but this will not resolve the inherent difficulties in developing a sensible classification structure for this low volume group. In the context of the funding models discussed in Section 7.3, the implications of the classification structure for psychogeriatric care are:

1 There were no same day episodes included in the data set used for analysis. There were only 10 partial same day episodes and 3 complete episodes in the total data set. Given the low volume, all were removed as outliers prior to analysis.

2 The mixed per diem/ per episode funding model seems to be appropriate.

3 Implementation of the classification requires use of two specific variables - phase and the HoNOS. The variable ‘phase’ is being tested in the parallel MH-CASC study and is termed ‘focus of care’. It is not included in the AN-SNAP overnight classification because, in that setting, it was not predictive of cost. In contrast, it proved to be a good predictor in the ambulatory setting. If ‘focus of care’ is not included in the MH-CASC classification, it would seen sensible to exclude it from further versions of the AN-SNAP classification because the ongoing cost of data collection and data entry may not be justified by a narrow application. It may be that a combination of HoNOS items can be found to act as a substitute.

4 Some psychogeriatric clients receive care from aged care services. One important implication of the classification design is that clinicians in aged care will require training in the use of the HoNOS if their clients are to be assigned to one of the psychogeriatric classes. This implication is fundamental to the design of AN-SNAP - it is designed to classify the person rather than the stream of care in which they are treated.

The parallel National Mental Health Classification and Services Cost project (MH-CASC) has also included ambulatory psychogeriatric care. Once the MH-CASC study is completed, consideration needs to be given to the amalgamation of the two ambulatory data sets so that further analysis can be undertaken. It will be important to determine whether the clinical profiles and patterns of care of the two cohorts are similar or different. It will also be important to determine whether the AN-SNAP and the MH-CASC classifications should have common ambulatory psychogeriatric classes in subsequent versions.

7.6.7.4 Geriatric Evaluation and Management

The AN-SNAP classification includes 8 classes for ambulatory Geriatric Evaluation and Management. 3 classes are for 'Assessment Only' and 5 are for treatment episodes. The classification was developed using the FIM as the standard measure of function.

In the context of the funding models discussed in Section 7.3, the implications of this classification structure for Geriatric Evaluation and Management are:

1 Assignment to the GEM classes requires the use of the FIM Motor Sub-Scale. However, the Barthel Index was successfully mapped to the FIM Motor Sub-Scale for the purposes of this study and there is no reason why this mapping could not be used for the implementation of the classification.

2 Measures designed to discriminate between GEM assessment episodes need to be incorporated into subsequent versions of the classification.

3 The mixed per episode / per diem model seems to be appropriate.

4 The AN-SNAP classification is a classification of clients and not of streams of care. Clients assigned to the Geriatric Evaluation and Management Case Type are managed by a range of providers, including both generalist community health and specialist aged care services. As with rehabilitation, training will be required in the use of the FIM.

7.6.7.5 Maintenance Care

The AN-SNAP classification includes 16 classes for ambulatory maintenance care - 6 for assessment and 10 for maintenance and support. The classification was developed using the RUG-ADL as the standard measure of function. In the context of the funding models discussed in Section 7.3, the implications of this classification structure for maintenance care are:

1 Maintenance care is provided both by individual disciplines and by multidisciplinary teams. The classification structure is designed for both types of maintenance care.

2 The mixed per episode/ per diem funding model seems to be appropriate. Under the funding model discussed in Section 7.3, ongoing episodes would be routinely assessed every three months. This reassessment may result in re-assignment to the existing class or assignment to a new one.

3 Measures designed to discriminate between Maintenance assessment episodes need to be incorporated into subsequent versions of the classification.

4 Provision needs to be made for the funding of exceptional cases. For maintenance episodes, these were predominantly the result of the cost of high cost medical and surgical supplies or expensive equipment. These costs are best funded outside a classification funding model.

8 Recommendations

8.1 That the AN-SNAP Version 1 Classification be adopted as the Australian national standard classification for sub-acute and non-acute care.

8.2 That the AN-SNAP Version 1 Classification be used to classify patients and not the service/stream of care/ward in which they are treated.

8.3 That the variables required to assign patient care episodes to AN-SNAP classes be incorporated into the next version of the National Health Data Dictionary.

8.4 That State/Territory Health authorities and other funding agencies give consideration to the funding model outlined in Section 7.4.

8.5 That, in relation to Palliative Care:

a) overnight care - the variables Palliative Care Phase, RUG-ADL score at phase start, and age be collected on a routine basis in those services to be funded using the AN-SNAP classes.

a) ambulatory care - the variables Palliative Care Phase, RUG-ADL score at phase start, Palliative Care Severity score, age and provider type be collected on a routine basis in those services to be funded using the AN-SNAP classes.

c) Palliative Care Phase and the RUG-ADL be incorporated into the Palliative Care minimum data set.

d) the Australian Association for Hospice and Palliative Care proceed to develop clinical standards for each of the palliative care classes.

e) Reason for Phase End be routinely collected and the RUG-ADL be collected at the end of all phases with the exception of phases ending with the death of the patient. This collection would allow for these variables to be considered in future versions of the classification and would provide data that will be useful for clinical audit.

f) ambulatory care - a supplementary analysis of the SNAP data set be undertaken using only the data from those sites known to provide a comprehensive service. This analysis should focus on controlling for the influence of 'shared-care' arrangements. If necessary, it should develop an alternative model based on per diem classification.

8.6 That, in relation to Rehabilitation:

a) overnight care - the variables Admission for Assessment Only, Functional Impairment Code, the FIM Motor sub-scale, the FIM Cognition sub-scale, and age be collected on a routine basis in those services to be funded using the AN-SNAP classes

b) ambulatory care - the variables Assessment Only, Functional Impairment Code, the FIM Motor sub-scale, age and provider type be collected on a routine basis in those services to be funded using the AN-SNAP classes

c) the Minimum Data Set for Rehabilitation (currently under development by the Faculty of Rehabilitation Medicine) include national standard measures of motor function and cognitive function for both overnight and ambulatory rehabilitation

d) overnight care - the FIM Motor sub-scale and the FIM cognition sub-scale be measured at discharge as a measure of functional gain and for the purposes of clinical audit

e) ambulatory care - motor and cognitive function need not be measured at episode end

f) consideration be given in the next version of the overnight classification to the establishment of separate classes for Burns and Pulmonary Rehabilitation.

g) consideration be given in the next version of the ambulatory classification to the establishment of separate classes for further impairment groups.

h) the two existing DRGs for rehabilitation be removed from the next version of the DRG classification.

8.7 That, in relation to Psychogeriatric Care:

a) overnight care - the variables HoNOS total score and individual HoNOS item scores be collected on a routine basis in those services to be funded using the AN-SNAP classes

b) ambulatory care - the variables Assessment Only, HoNOS total score, individual HoNOS item scores and phase be collected on a routine basis in those services to be funded using the AN-SNAP classes

c) the SNAP and MH-CASC data sets be combined to allow for a comparative analysis of psychogeriatric episodes

d) if supported by the data, common classes for psychogeriatric care be included in subsequent versions of the SNAP and MH-CASC classifications.

8.8 That, in relation to Geriatric Evaluation and Management:

a) overnight care - the variables FIM Motor sub-scale, the FIM Cognition sub-scale, and age be collected on a routine basis in those services to be funded using the AN-SNAP classes

b) ambulatory care - the variables Assessment Only, the FIM Motor sub-scale and provider type be collected on a routine basis in those services to be funded using the AN-SNAP classes

c) the Australian Society for Geriatric Medicine and the Faculty of Rehabilitation Medicine proceed to develop mappings from the various measures of motor and cognitive function to the FIM Motor sub-scale and the FIM Cognition sub-scale

d) variables designed specifically to discriminate between episodes within the Geriatric Evaluation and Management Case Type be incorporated into subsequent versions of the classification, including measures designed to discriminate between assessment only episodes.

8.9 That, in relation to Maintenance Care:

a) overnight care - the variables Type of Maintenance Care and the RUG-ADL be collected on a routine basis in those services to be funded by use of the AN-SNAP classification

b) ambulatory care - the variables Assessment Only, the RUG-ADL, age and provider type be collected on a routine basis in those services to be funded by use of the AN-SNAP classification

c) the implication of the findings of this study be explored in relation to the Acute Care Certification Process and the “35 day rule” with a view to the incorporation of any changes into the next national Medicare Agreement (1998-2003)

8.10 That, in relation to all ambulatory care:

a) a standard national measure of motor function, a standard national measure of cognitive function and a standard national measure of instrumental activities of daily living, each of which is appropriate for use in the ambulatory setting, be developed for

incorporation into subsequent versions of the classification

b) the variables required to assign ambulatory episodes to AN-SNAP classes be incorporated into the Community Health Information Model (CHIME) codesets

c) a standard measure of carer availability be developed and tested for incorporation into subsequent versions of the classification

d) the Commonwealth develop a policy on ambulatory casemix classification that addresses development issues relating to the classification of outpatient, community health and HACC services.

8.11 That, in relation to the data collected in this study:

a) a supplementary analysis be undertaken of the patterns of care of each of the classes

b) a supplementary analysis be undertaken of the potential to bundle overnight and ambulatory episodes to form an 'episode of illness' classification and funding model

c) a second set of weights for each of the classes be calculated that are calibrated relative to AN-DRG weights

d) service weights for each cost component be calculated so that future versions of the classification can be developed without the requirement for any further intensive utilisation studies.

8.12 That two different types of AN-SNAP grouper software be developed:

a) a software grouper that groups only in-scope episodes and that allows providers of sub-acute and non-acute care to classify their own patients. For preference, this would be a public-domain product with the copyright remaining with the Commonwealth Department of Health and Family Services

b) software that groups both DRG episodes and SNAP episodes. This could occur as an extension of the current development program for the next version of the DRG grouper.

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Appendix 4 Definitions used in the SNAP Study

Alphabetical listing

Administration - see Staff time definitions
Admitted Patient - see Episode definitions
Capital Costs - see Finance definitions
Case Type - see Case definitions
Clinical travel time - see Staff time definitions
Community client - see Episode definitions
Costs of receiving external services - see Finance definitions
Cost of supplying external services - see Finance definitions
Delineated role - see Other definitions
Episode of Care - see Episode definitions
Episode of Care (overnight stay admitted patients) - see Episode definitions
Episode of Care (same day admitted patient, outpatient and community client) - see Episode definitions
Episode End (overnight stay admitted patient) - see Episode definitions
Episode End (same day admitted patient, outpatient or community client) - see Episode definitions
Episode Start (overnight stay admitted patient) - see Episode definitions
Episode Start (same day admitted patient, outpatient or community client) - see Episode definitions
External management services - see Finance definitions
General clinical time - see Staff time definitions
Geriatric Evaluation and Management - see Case definitions
Health promotion - see Staff time definitions
Other travel - see Staff time definitions
Outpatient - see Episode definitions
Maintenance Care - see Case definitions
Major accrual adjustments - see Finance definitions
Multidisciplinary Assessment and/or Management - see Other definitions
Non-admitted patient/client - see Episode definitions
Offsets - see Finance definitions
Overnight stay admitted patient - see Episode definitions
Palliative Care - see Case definitions
Palliative Care Phase - see Episode definitions
Patient/client - see Other definitions
Patient attributable time - see Staff time definitions
Psychogeriatric care - see Case definitions
Revenue - see Finance definitions
Quality improvement - see Staff time definitions
Same day admitted patient - see Episode definitions
Rehabilitation - see Case definitions
Research - see Staff time definitions
Teaching and learning - see Staff time definitions
Termination leave payments - see Finance definitions

Case Type

High level classification of a patient care episode based on characteristics of the person, the primary treament goal and evidence. There are five SNAP Case Types:

1 Palliative Care
2 Rehabilitation
3 Psychogeriatric Care
4 Geriatric Evaluation and Management
5 Maintenance Care

Palliative Care

An episode of care;

- provided for a person with an active, progressive, far advanced disease with little or no prospect of cure and
- for whom the primary treatment goal is quality of life
- which is evidenced by:
  - + multidisciplinary assessment and/or management of the physical, psychological, emotional and spiritual needs of the person
  - + a grief and bereavement process for the person and their carers/family

Inclusions:

A palliative care provided in both community and hospital settings
B grief and bereavement support services for the family and carers during the life of the person and continuing after death.

Rehabilitation

An episode of care;

- provided for a person with an impairment, disability or handicap and
- for whom the primary treatment goal is improvement in functional status
- which is evidenced by:
  - + an individualised and documented initial and periodic assessment of functional ability by use of a recognised functional assessment measure.
  - + an individualised multidisciplinary rehabilitation plan which includes negotiated rehabilitation goals and indicative time frames.

Inclusions:

A Rehabilitation care provided in both community and hospital setting.

Psychogeriatric care

An episode of care;

- provided for an elderly person with either an age-related organic brain impairment with significant behavioural disturbance or late onset psychiatric disturbance or a physical condition accompanied by severe psychiatric or behavioural disturbance and
- for whom the primary treatment goal is improvement in health, modification of symptoms and enhancement in function, behaviour or quality of life
- which is evidenced by:
  - + multidisciplinary assessment and/or management of complex medical, psychiatric and functional conditions and needs
  - + regular reassessments
  - + working towards negotiated goals within an indicative time frame

Inclusions:

A psychogeriatric care provided in both community and hospital settings
B psychogeriatric care of younger adults with clinical conditions generally associated with old age

C psychogeriatric care of people with long term psychiatric disturbance and/or substance abuse

Geriatric Evaluation and Management

An episode of care;

- provided for a person with complex multi-dimensional medical problems associated with disabilities and psychosocial problems, usually (but not always) an older person and
- for whom the primary treatment goal is maximising health status and/or optimising living arrangements
- which is evidenced by:
  - evaluation and formulation of a management plan for complex medical problems
  - multidisciplinary assessment and management of functional and psychosocial needs
  - regular assessments of current management plan working towards negotiated goals within indicative time frames

Inclusions

A geriatric evaluation and management provided in both community and hospital settings

B evaluation and management of younger adults with clinical problems generally associated with old age

Maintenance Care

An episode of care:

- provided for a person with a disability who, following assessment or treatment, does not require further complex assessment or stabilisation and
- for whom the primary treatment goal is the maintenance of function and current health status if possible
- which is evidenced by:
  - the provision of health and treatment services and psychosocial support

Types of maintenance care:

A maintenance care provided in both community and hospital settings

B care and support of a person in an inpatient setting whilst the patient is awaiting transfer to residential care or alternate support services or where there are factors in the home environment (physical, social, psychological) which make discharge to home inappropriate for the person in the short term

C ongoing care and support of a person in a residential setting

D patients in receipt of care where the sole reason for admitting the person to hospital is that the care that is usually provided in another environment eg at home, in a nursing home, by a relative or with a guardian, is unavailable in the short-term

E care and support of a person with a functional impairment for whom there is no multidisciplinary program aimed at improvement of functional capacity

F patients classified as Nursing Home Type Patients ie when a patient has been in hospital for a continuous period exceeding 35 days and does not have a current acute care certificate

Episode Definitions

Admitted Patient

An admitted patient is a patient who undergoes a hospital's formal admission process having met the criteria for admission as specified in the National Health Data Dictionary.

Overnight stay admitted patient

A patient who is admitted and discharged on different dates.

Same day admitted patient

A patient who is admitted and discharged on the same date.

Non-admitted patient/client
A non-admitted patient/client is a person who does not undergo a hospitals' formal admission process. Non-admitted patients/clients may be treated in outpatient, community and domiciliary settings by either hospital or community health agencies.

Outpatient
A patient who receives care in a hospital clinic.

Community client
A client who receives care in the home or other non-hospital site (including community health centres).

Episode of Care
A period of contact between a patient/client and a provider or team of providers that occurs in one setting (either overnight admitted patient, same day admitted patient, outpatient or community) and in which there is no major change in the goal of intervention (primary or acute or psychiatric or palliative or rehabilitation or psychogeriatric or geriatric evaluation and management or maintenance care).

Episode of Care - overnight stay admitted patients
An episode of care refers to the phase of treatment rather than to each individual bed day. There may be more than one episode of care within the one overnight stay period. An episode of care begins on the day that the person meets the criteria for one of the Case Types defined above. This may be the same as the date the person was admitted to hospital or a date during the hospital stay. An episode of care ends when the principal clinical intent of the care changes or when the patient is formally separated from the hospital. Each episode of care has an episode start and continues until an episode end.

Episode Start - overnight stay admitted patient
An episode of care starts in one of the following ways:
1 the patient is admitted to a hospital from a nursing home and receives hospital treatment for a minimum of one night.
2 the patient is admitted to a hospital from other accommodation (includes home, hostel, group home, holiday accommodation) and receives hospital treatment for a minimum of one night.
3 the patient is admitted to a hospital following discharge/transfer from another hospital and receives hospital treatment for a minimum of one night.
4 completion of an acute episode of care in another ward of this hospital and the start of an episode of sub-acute or non-acute care that meets the criteria for one of the five SNAP case types.
5 completion of an acute episode of care in the same ward and the start of an episode of sub- or non-acute care that meets the criteria for one of the five SNAP case types.
6 completion of a sub-acute or non-acute episode in this hospital and the start of another sub-acute or non-acute episode that meets the criteria for another SNAP case type.
7 statistical admission following leave of absence exceeding seven consecutive days

Episode End - overnight stay admitted patient
An episode of care ends in one of the following ways:
1 the patient is discharged to a nursing home
2 the patient is discharged to home, hostel or group home
3 death
4 discharge/transfer to a acute or non-acute hospital
5 completion of a sub-acute or non-acute episode and the start of an acute episode of care in another ward of this hospital
6 completion of a sub-acute or non-acute episode and the start of an acute episode of care remaining in the same ward
7 completion of a sub-acute or non-acute episode and the start of another sub-acute or non-

acute episode of care in this hospital
8 left against medical advice/discharge at own risk
9 statistical discharge from leave
10 for the purposes of this study, the episode of care will be deemed to end for all patients/clients still in receipt of care at the completion of the study period

Episode of Care - same day admitted patient, outpatient and community client
An episode of care is a sequence of care provided to a person who is either a same day admitted patient, an outpatient or a community client. There may be more than one visit within the episode of care. An episode of care begins on the day that the person meets the criteria for one of the Case Types defined above. An episode of care ends when the principal clinical intent of the care changes, the patient category changes (eg the patient is discharged as a same day admitted patient and becomes an outpatient or community client) or at discharge/case closure.

Episode Start - same day admitted patient, outpatient or community client
An episode of care starts in one of the following ways:
A the patient/client has first contact following a referral (including self-referral)
B completion of an episode of care as an overnight admitted patient and commencement of an episode of care as a same day admitted patient, outpatient or community client
C completion of an primary care or acute episode in this facility/service and the start of a sub-acute or non-acute episode of care that meets the criteria for one of the SNAP case types
D completion of a sub-acute or non-acute episode in this facility/service and the start of another sub-acute or non-acute episode of care that meets the criteria for another SNAP case type
E change of episode type - the patient category changes between same day admitted patient, outpatient and community client.

Episode End - same day admitted patient, outpatient or community client
An episode of care ends in one of the following ways:
A discharge/case closure
B death
C admitted/transfer to hospital as an overnight stay patient
D completion of a sub-acute or non-acute episode and the start of an acute or primary episode of care in this service
E completion of a sub-acute or non-acute episode and the start of another sub-acute or non-acute episode of care in this service
F change of episode type between same day admitted patient, outpatient and community client
G for the purposes of this study, the episode of care will be deemed to end for all clients still in receipt of care at the completion of the study period

Palliative Care Phase
(1) Stable Phase
All clients not classified as unstable, deteriorating, or terminal.
- The person's symptoms are adequately controlled by established management. Further interventions to maintain symptom control and quality of life have been planned.
- The situation of the family/carers is relatively stable and no new issues are apparent. Any needs are met by the established plan of care.

(2) Unstable Phase
- The person experiences the development of a new problem or a rapid increase in the severity of existing problems, either of which require an urgent change in management or emergency treatment
- The family/carers experience a sudden change in their situation requiring urgent intervention by members of the multidisciplinary team.

(3) Deteriorating Phase
- The person experiences a gradual worsening of existing symptoms or the development of new

but expected problems. These require the application of specific plans of care and regular review but not urgent or emergency treatment.

- The family/carers experience gradually worsening distress and other difficulties, including social and practical difficulties, as a result of the illness of the person. This requires a planned support program and counselling as necessary.

(4) Terminal Care Phase

Death is likely in a matter of days and no acute intervention is planned or required. The typical features of a person in this phase may include the following:

- Profoundly weak
- Essentially bed bound
- Drowsy for extended periods
- Disoriented for time and has a severely limited attention span
- Increasingly disinterested in food and drink
- Finding it difficult to swallow medication.

This requires the use of frequent, usually daily, interventions aimed at physical, emotional and spiritual issues.

- The family/carers recognise that death is imminent and care is focussed on emotional and spiritual issues as a prelude to bereavement.

(5) Bereaved Phase

Death of the patient has occurred and the carers are grieving. A planned bereavement support program is available including counselling as necessary.

Staff Time Definitions

Patient attributable time

All time spent in **direct hands on care**, including assessment, treatment and escort, and **indirect time** such as phone calls relating to the patient, communicating with relatives and carers, case conferences, liaison with other health professionals about the patient/client, organising interpreters, writing patient records, inspecting homes, arranging patient discharge, staff supervision in relation to a specific patient/client, developing a case plan etc. It includes **direct group** care provided to patients treated in groups where the individual patients can be identified (eg therapy groups for registered patients/clients). Excludes travel time.

General clinical time

All time spent on clinical activities that cannot be attributed to any one patient/client. Includes ward rounds, team allocation meetings, intake, handover, patient clinical team meetings.

Clinical travel time

All on-duty time spent travelling to see one or more patients/clients.

Teaching and learning

All time associated with clinical staff attending recognised award courses, the training and supervision of students, and the conduct of lectures and seminars (including inter departmental and interagency work). Includes preparation and travel time.

Research

All time spent on activities which are undertaken to advance knowledge in the health field. These include basic research designed to improve understanding about the courses of illness, applied research aimed at the evaluation of health programs and activities directed towards technology advancement. Includes preparation and travelling time.

Health promotion

All time spent on prevention activities with people who are not registered clients/admitted patients. Includes participation in activities with the general public (eg information provision in a shopping centre

during Senior Citizens Week), running health education groups for people who are not registered clients/admitted patients (eg Health Lifestyle groups), community development (eg working with the community to establish a self-help group) and working with the media.

Other travel
All on-duty time spent travelling for any other purpose (eg to pick up stores or attend a meeting)

Quality improvement
All time spent on all quality improvement activities including quality assurance and staff development

Administration
All other time on duty

Finance Definitions

Revenue
The inflow of funds resulting from:

Patient fees receipts for Medicare, inpatients, sameday patients and non-inpatients (e.g.: pharmaceuticals, outreach services and other miscellaneous fees).

Special funds including:
- Private practice funds after allowing for direct operating costs, from revenue received in respect of service fees to medical practitioners who exercise rights to private practice.

Other Revenue including:
- Meals and Accommodation
- Motor vehicle sales
- Property rental
- Profit on sale of assets
- Scrap materials and metals sales
- Vending machine revenue
- Telephones
- Interest earned on public funds
- Profits from external sources
- Commissions from health funds or life assurance companies
- Other non-recurrent revenue including receipts from sale of equipment purchased from operating funds.
- Specific grants provided to the participating organisations from Universities, Commonwealth/State, Local Government, Employment Grants, Special Commonwealth Grants.

Offsets
The practice of offsetting receipts against payments. That is, when revenue received for services provided outside the institution is used to reduce the costs associated with providing the service. Revenue received for services provided outside the institution that is normally paid to State Health Authorities/Treasury is excluded.

Costs of receiving external services
Adjustment of operating costs to reflect the value of services provided by external agencies and which are not reflected in institution operating expenditure. Services such as regional or Statewide laundry, laboratory, supply, or corporate administrative services are included.

Cost of supplying external services

All costs associated with providing external services to other agencies. Where an institution provides services to other sites, such as providing payroll services to a region/area, only the costs associated with institution specific payroll production are included in the costing study.

External management services
Where external agencies receive or provide management or administrative type services to another institution. Includes Area or Regional Administrations which are not part of the State Health Department/Authority Administration and Corporate Management Offices.

Termination leave payments
Termination leave payments include all costs associated with resignation, retirement and redundancy payments.

Capital Costs
That expenditure relating to asset acquisition. An asset is defined as a functional unit of equipment which is required for continuing use in the provision of services and is necessary for the functioning of the palliative care unit, rehabilitation unit, etc. Funds for such assets may be provided either from within the organisation's and/or department's operating funds (or provisions) or from external sources. For consistency purposes, a lower limit of $5,000 per item is used. Items of lower value are considered as expenses equating to repairs, maintenance and refurbishment.

Major accrual adjustments
The adjustments necessary to align expenditure on goods and services to the period in which the same goods and services were used or consumed.

Other Definitions

Multidisciplinary Assessment and/or Management
In the sub-acute and non-acute inpatient setting, assessment and/or treatment services provided jointly by a team that consists of a number of professional disciplines. This team would include allied health, nursing and medical practitioners. In the ambulatory sub-acute and non-acute setting, multidisciplinary management may occur after one health professional has undertaken a comprehensive assessment across a number of disciplines. In this context, multidisciplinary management would include participation in a multidisciplinary case conference convened in order to review the findings of the assessment and to develop a case management plan. It also includes access to other disciplines for consultation and referral as required and a mechanism for ongoing multidisciplinary review.

Patient/client
A person for whom a health care provider accepts responsibility for assessment and/or treatment as evidenced by the existence of a medical record. Family/carers are included in this definition if interventions relating to them are recorded in the patient/client medical record. For the purpose of Palliative Care this includes the bereaved family of the deceased patient/client.

Delineated role
The role and level of service provided by each participating site as classified using the following descriptions:

PALLIATIVE CARE

Level 0
No Service

Level 1

Primarily supportive. Management and/or care planning/consultation by general practitioners and community nurses (community patients). Non-designated beds (inpatients). Consultation available as required from medical practitioner specialising in palliative care, clinical nurse consultant in palliative care and/or allied health staff. Continuing staff education programs in palliative care available.

Level 2
As Level 1 plus designated multidisciplinary palliative care team. Specialist community palliative care service that includes mobile consultancy support from medical practitioner specialising in palliative care (community patients). Hospice or designated palliative care beds managed by medical practitioner specialising in palliative care (admitted patients). Pastoral care and bereavement support provided. Designated allied health staff are an integral component of the service. Access to bereavement counselling service.

Level 3
As Level 2 plus integrated community and/or hospice and/or hospital consultative service under direction of medical practitioner accredited in palliative care or palliative care physician. Has medical officer or medical registrar. Specialist nursing staff with post basic qualifications and experience in palliative care rostered 24 hours. Has links with oncology, radiotherapy, anaesthetics, psychiatry, multi-disciplinary pain clinic, rehabilitation and surgical services. Palliative care specialist providing formal consultation liaison to other services. Conducts formal teaching and research.

REHABILITATION

Level 0
No service, or allied health professionals as for general medicine

Level 1
Slow stream or restricted, active rehabilitation. Referral and management by medical officer or by specialist physicians with a special interest in rehabilitation, supported by 24 hour cover by medical officers. Access to physicians in rehabilitation medicine and liaison psychiatrist, audiologist, dietician and psychologist. Clinical nurse consultant and some registered nurses having or undertaking post basic studies in rehabilitation. Designated allied health professionals. Outpatient services with accessible transport available.

Level 2
Active inpatient and outpatient rehabilitation programs. Unit directed by a physician in rehabilitation medicine supported by on-site medical officers. Clinical nurse consultant with post basic qualifications essential. Salaried interdisciplinary team of physiotherapists, occupational therapists, speech pathologists and either salaried or consultant social workers, psychologist and dietitian. Access to hydrotherapy, orthotics and prosthetics, audiology, liaison psychiatry, vocational services. Coordinates with orthopaedic, neurology and neurosurgery services. May have a teaching role.

Level 3
As Level 2 plus is geographically part of a tertiary referral acute hospital or has links with a major referral hospital. Provides post-graduate training in rehabilitation medicine. May have supra-regional role (e.g. spinal unit; amputee unit; traumatic brain injury unit). Conducts formal teaching and research.

PSYCHIATRY OF OLD AGE

Level 0
No Service

Level 1
Primarily supportive. Services provided by community health services, aged care services or mental health services in conjunction with general practitioners. Access to consultation services from psychiatrists and general physicians as required.

Level 2
As Level 1 plus active assessment and rehabilitation service involving inter-disciplinary team providing services to community patients and/or inpatients. Has designated beds. Medical services provided by specialists in geriatric medicine and/or specialists in the psychiatry of old age. Access to appropriate allied health professionals.

Level 3
As Level 2 plus specialist service incorporating designated inpatient service and designated community team. Nominated specialist director and 24 hour access to registrars in psychiatry and geriatric medicine. Access to clinical nurse consultant. Conducts formal teaching and research.

GERIATRIC MEDICINE

Level 0
No service

Level 1
Primarily supportive. Personal and nursing care available as necessary. Referral, management and consultation by general practitioner available. Links to Home and Community Care Services and hostel and nursing home accommodation. Inpatient services in non-designated beds. Continuing nursing educational programs available specific to the needs of the service. Can provide respite care. Access to allied health professionals.

Level 2
As Level 1 plus active assessment and rehabilitation involving inter-disciplinary team providing services to day patients and in-patients. Has nursing unit manager and clinical nurses. Medical services provided by specialists supported by medical registrars or medical officers. Access to consultant physician in geriatric medicine. Consultation and referral links to relevant medical and surgical services. Designated allied health professionals.

Level 3
As Level 2 plus integrated assessment in-patient unit and domiciliary consultant service. Has geriatrics registrar. Link with in-patient rehabilitation unit. Access to clinical nurse consultant with post basic qualifications in gerontological nursing is desirable. Has specialist nurses rostered 24 hours. Has, or links with geriatric psychiatry service. Conducts formal teaching and research.

COMMUNITY HEALTH

Level 0
No service

Level 1
Provision of domiciliary nursing services. Includes co-ordination and provision of direct care service and development of care plans in close liaison with general practitioner and/or other community support services. Links to other community-based and in-patient health facilities.

Level 2

As Level 1 plus designated community team providing a range of primary care services and additional services based on identified needs of the catchment population such as supportive counselling/advice to clients and relatives, population based screening or health promotion activities. Provision of a broad range of programs for target group. Continued staff education programs specific to the needs of the service. Provision of psychosocial counselling and/or access to allied health professionals and/or a range of consultants/specialist teams. Planning and review are integral part of service provision.

Level 3

As Level 2 plus well developed planning and review of service provision based on community needs. Allied health professionals are integral members of the multidisciplinary team. Integrated hospital and community services have full time staff specialising in specific community health programs targeting particular health problems of population groups. May have specialised sub-teams or functional units. Inter-agency liaison mechanisms. Coordinated services may have multiple centres operating out of a central base. Community-based manager responsible for the multidisciplinary service. May have some general (non-specialist) workers at the neighbourhood centre level for first line assessment, referral and community development roles. Extensive health promotion and prevention program with formal outcome evaluation. Conducts formal teaching and research.

Appendix 5

Data Collection Forms

(Not included in PDF version of report)

Appendix 6 National SNAP Study Sites

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NSW	**Sandy Colyer**
Alwyn Rehabilitation	John Franta
Ballina Hospital	Brett Oxenford
Berkeley Vale Private	Fiona Kitching/Peter Bailey
Blacktown Rehabilitation & Aged Care Services	Mary Lewis-Jones/Susanne Cooper
Calvary Hospital, Kogarah	Sheila Knight
Community Rehabilitation and Geriatric Services (CRAGS)	Lynnette Lee
Campbell Hospital, Coraki	Bob Boyes
Canterbury Hospital	Sheldon Sullivan
Cobar District Hospital	Karen Brewster
Coledale Hospital	Janet Chaplin
Coonamble District Hospital	Angela Rippon
Concord Hospital	Jan Steen/Prue Farrell
David Berry Hospital	Rita Sullivan
Gulargambone Hospital	Gayle Ramien
Nepean Hospital	Lawrence Chu
Homeleigh	Andrew Hreszczuk
Hornsby Hospital	Alison Powis
Hunter Valley Private	Margaret Lownes
Hunters Hill Private	Mark Compton/Sarah Best
Illawarra Community Health	Rosemary Steele/Mary-Kate Pickett
Illawarra Regional Hospital	Sheila Owens
John Hunter Hospital Rankin Park	Helen Kruse
Lady Davidson Hospital	Eve Allan
Lawrence Hargrave Hospital	Helen Webb/Robyn Ashe
Lourdes Hospital	Andrea Tintner
Mount Wilga Rehabilitation Centre	Kath Le Gay Brereton
Narromine District Hospital	Ann Chad/Sandra Manton

SITE	COORDINATORS
Northern Rivers Community Health Services : Ballina Primary Health Lismore Community	 Lisa Deaux Sue-Ann Mills McCarthy
Nyngan District Hospital	Janine Stewart
Prince Henry Hospital	Jenny Smith
Quirindi Health Service	David Quirk
Royal Newcastle	Keith Drinkwater
Royal Rehabilitation Centre	Charlotte Roberts
Sacred Heart Hospice	Sophie Cassimatis / David Webb
St Joseph's Auburn	Megan Price-Reid
St Vincent's Lismore	Maureen Winterton
Tamworth ACAT Tamworth Community Health	C Beckett Deirdre Hulton
Tamworth Base Hospital: Brain InjuryUnit Palliative Care Rehabilitation Unit Hilltop Lodge CADE Unit	Deirdre Hulton Paul Gorrick John Troller P Harradine Rhonda King/Joanna Dean
Toronto Private Hospital	Brenda Crawford-Warren
Walcha Health Service	Sue Dafter
Warren District Hospital	Patricia Christoff
Wellington District Hospital	Judith Scott
Western Sydney Community Health: Auburn Community Health The Hills Community Health	 John Mitchell Patricia Cameron
Westmead Hospital	Janelle Crooks
Northern Territory	**Chris Flavell**
Royal Darwin	Chris Flavell
Queensland	**James Thiedeman**
Mount Olivet	John Roadley
Prince Charles Hospital	Mark McDonnell
Redcliffe Hospital Rockhampton Base Hospital	Carrie Withers/Jo Walters Colin Bartlem/Lynelle Reid
Royal Brisbane	Glynda Summers
Toowoomba	Michael Bishop
Townsville General Hospital	Robyn Reid/Sam Nicolosi
South Australia	**Kate Rice**

SITE	COORDINATORS
Calvary, Adelaide	Craig Lukeman
Daw House, Repatriation: Daw Park Hospice Rehabilitation	 Heidi Kliche/Debbie Parker Shelley Horne
Gumeracha Soldier's	Nancy Schulz
Griffith Rehabilitation	Helen Taylor
Hampstead Centre	Ruth Marshall / Bob Penhall / Julie Sakoulas
Julia Farr Services	Kathy Willis / Peter Anastassiadis
Payneham Services	Graham McLean
Port Pirie	Louise Thompson/ Dominic Lobasso
St Margaret's	Rosalie Maher
Women's & Children's	Chris Pearson
Tasmania	**Pat Sandercock**
John Grove Day Centre	Melissa Grey
Launceston General Hospital	Melissa Grey
Royal Hobart: Whittle Ward (Pall Care) Dwyer Ward (Rehab)	 Ann Allanby Marilyn Wells
Southern Region Community Palliative Care	Clare Healey
Eastern Shore Home Care	Wendy Harvey/Merryl Lane
Victoria	**Jenny Elliott**
Alfred Healthcare, Caulfield	Kaye Hocking
Cedar Court	Peter Lowthian
Donvale Rehabilitation	Jenny Smith
Elsternwick Private	Desi Papadimitriou
Royal Melbourne Essendon	Shane Durant
Florence Nightingale	Juliette Taranto
Hopetoun Rehabilitation Centre	Campbell Telford
North West Hospital	Lynne Greenwood
Olympia Rehabilitation	Lee Brown
Royal Talbot	Jacinta O'Meara
St Vincent's Hospital	Bronte Kumm
Western Australia	**Barbara Campbell**
Albany Hospital	Dimity Moore
SITE	**COORDINATORS**

SITE	COORDINATORS
Armadale/Kelmscott	Phil Moody
Cottage Hospice	Phil McDonald/Alison Perret
Royal Perth, Shenton Park	Philip Baistow
Silver Chain Nursing Association	Shirley Glasgow
New Zealand	
Auckland Healthcare: Auckland Hospital Auckland Community Health	Delwyn Armstrong
Mary Potter Hospice, Wellington	Helen Carter
Waitamata Health: North Shore Hospital Waitamata Community Health	Delwyn Armstrong

Appendix 7

Case and Episode Type by Study Site

SITE	PALLIATIVE CARE				REHABILITATION				PSYCHOGERIATRIC				GEM				MAINTENANCE				SNAP TOTAL
	o'night	day	outpt	comm	o'night	day	outpt	comm	o'night	day	outpt	comm	o'night	day	outpt	comm	o'night	day	outpt	comm	
1	0	0	0	216	0	0	0	22	0	0	0	0	0	0	0	18	0	3	0	1797	**2056**
2	270	5	0	302	94	1	7	149	0	0	0	23	8	3	0	746	5	0	0	4	**1617**
3	16	1	0	2	256	75	49	3	49	0	3	0	330	100	414	243	12	0	1	5	**1559**
4	0	0	0	261	0	0	0	29	0	0	0	0	0	0	0	133	0	0	0	1021	**1444**
5	117	7	60	191	138	4	128	5	60	0	94	1	12	0	9	62	2	0	143	91	**1124**
6	0	0	0	0	266	2	284	26	0	0	0	0	0	0	0	1	0	0	180	353	**1112**
7	27	0	0	1	137	42	20	1	7	0	3	0	237	23	114	448	13	1	2	5	**1081**
8	2	0	0	61	106	0	14	1	8	0	0	7	49	2	25	80	73	5	37	437	**907**
9	2	0	0	0	274	0	26	0	4	0	1	0	28	0	0	0	130	0	282	0	**747**
10	56	1	0	10	286	0	4	1	0	0	0	0	122	0	24	166	30	0	0	0	**700**
11	0	0	0	0	386	23	274	0	0	0	0	0	0	0	0	0	0	0	0	0	**683**
12	0	0	0	0	353	3	214	0	0	0	0	0	0	0	0	0	0	0	0	0	**570**
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	568	**568**
14	115	2	0	0	53	1	0	0	75	2	0	0	33	109	0	0	106	26	0	1	**523**
15	0	0	0	0	263	110	1	0	0	0	0	0	127	1	0	0	6	0	0	0	**508**
16	31	0	0	0	51	0	0	0	1	0	0	0	295	2	0	0	93	1	0	0	**474**
17	0	0	0	0	138	1	56	123	0	0	0	0	10	1	16	0	11	0	107	10	**473**
18	86	0	0	364	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**450**
19	0	0	0	4	0	0	18	64	0	0	0	0	0	0	0	0	0	1	1	311	**399**
20	0	0	5	32	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	349	**388**
21	0	0	0	0	201	1	144	27	1	0	0	0	3	0	0	0	1	0	2	1	**381**
22	28	5	23	23	124	1	91	42	1	0	0	0	2	0	0	6	0	0	0	0	**346**
23	8	0	0	0	220	3	1	0	30	0	0	0	60	0	0	0	40	0	0	0	**362**
24	0	0	0	0	265	69	0	0	0	0	0	0	24	0	0	0	0	0	0	0	**358**
25	122	1	0	226	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**349**
26	1	0	0	0	140	27	56	66	46	0	0	0	0	0	0	0	3	0	0	0	**339**
27	0	0	0	0	264	11	30	23	0	0	0	0	0	0	0	0	0	0	0	0	**328**
28	0	0	0	0	0	0	3	66	0	0	0	0	0	0	1	212	0	0	0	40	**322**
29	1	0	0	0	116	9	0	0	48	0	0	0	78	3	0	1	60	3	0	0	**319**
30	0	0	0	0	0	0	0	0	7	1	40	0	0	0	0	0	0	0	0	263	**311**
31	0	0	0	0	303	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	**304**
32	0	0	0	4	0	0	0	2	25	1	0	44	33	0	1	188	0	0	0	1	**299**
33	0	0	0	0	99	84	0	0	0	0	0	0	1	0	0	0	106	0	0	0	**290**
34	12	0	0	11	0	0	0	0	5	0	0	2	1	0	0	0	21	0	0	187	**239**
35	0	0	0	0	0	0	0	0	0	0	0	238	0	0	0	0	0	0	0	0	**238**
36	0	0	0	0	226	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**226**
37	0	0	1	78	0	0	0	0	0	0	0	1	0	0	0	26	0	0	0	117	**223**
38	0	0	0	6	0	0	0	26	0	0	0	1	0	2	0	24	0	0	0	158	**217**
39	0	0	0	0	186	0	0	0	0	0	0	0	1	0	0	0	23	0	0	0	**210**

SITE	PALLIATIVE CARE				REHABILITATION				PSYCHOGERIATRIC				GEM				MAINTENANCE				
	o'night	day	outpt	comm	o'night	day	outpt	comm	o'night	day	outpt	comm	o'night	day	outpt	comm	o'night	day	outpt	comm	
40	73	0	0	3	108	0	6	0	0	0	0	0	4	0	0	0	15	0	0	0	**209**
41	0	0	0	0	77	0	0	0	0	0	0	0	128	0	0	0	0	0	0	0	**205**
42	0	0	0	203	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**203**
43	0	0	1	201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**202**
44	152	0	0	0	44	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**197**
45	0	0	0	0	101	2	88	0	0	0	0	0	0	0	0	0	0	0	0	0	**191**
46	0	0	0	0	161	0	0	0	0	0	0	0	10	0	0	0	16	0	0	0	**187**
47	95	3	58	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	**181**
48	0	0	0	178	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**178**
49	67	1	0	0	58	0	0	0	0	0	0	0	1	1	0	0	49	0	0	0	**177**
50	0	0	0	0	0	71	3	47	0	0	0	0	0	0	0	0	0	3	3	47	**174**
51	160	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**167**
52	164	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	**167**
53	2	0	0	0	150	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	**163**
54	3	0	0	0	82	0	0	0	5	0	0	0	62	1	0	0	1	0	0	0	**154**
55	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137	**152**
56	0	0	0	0	92	1	0	0	1	0	0	0	20	0	0	0	35	0	0	0	**149**
57	0	0	0	0	0	0	38	1	0	0	0	0	0	0	44	4	0	2	56	3	**148**
58	0	0	0	0	136	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	**148**
59	0	0	0	24	0	0	0	1	0	0	0	0	0	0	0	2	0	0	0	120	**147**
60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145	**145**
61	3	0	0	4	0	0	0	0	1	0	0	0	18	0	0	2	37	2	0	76	**143**
62	51	3	0	0	78	2	0	0	1	0	0	0	0	0	0	0	3	0	0	0	**138**
63	5	0	0	0	61	4	0	0	0	0	0	0	48	5	0	0	7	1	0	0	**131**
64	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	5	0	0	1	118	**126**
65	5	0	0	2	0	0	0	0	0	0	0	0	3	0	0	0	19	0	0	93	**122**
66	0	0	0	0	93	15	14	0	0	0	0	0	0	0	0	0	0	0	0	0	**122**
67	0	0	0	0	77	1	42	0	0	0	0	0	0	0	0	0	0	0	0	0	**120**
68	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	116	0	0	0	**116**
69	27	3	0	68	0	0	0	0	0	0	0	0	2	1	0	15	0	0	0	0	**116**
70	54	3	0	0	42	1	0	0	0	0	0	0	0	0	0	0	12	0	0	0	**112**
71	10	0	0	0	66	17	0	0	1	0	0	0	2	0	0	0	14	1	0	0	**111**
72	0	0	0	0	98	2	0	0	0	0	0	0	5	0	0	0	0	0	0	0	**105**
73	0	0	0	0	25	1	75	2	0	0	0	0	0	0	0	0	0	0	0	0	**103**
74	11	0	0	1	6	0	2	1	0	0	0	0	15	0	1	3	32	0	11	20	**103**
75	0	0	0	0	102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**102**
76	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0	16	61	**101**
77	0	0	0	0	87	0	0	0	0	0	0	0	6	0	0	0	4	0	0	0	**97**

SITE	PALLIATIVE CARE				REHABILITATION				PSYCHOGERIATRIC				GEM				MAINTENANCE				SNAP TOTAL
	o'night	day	outpt	comm	o'night	day	outpt	comm	o'night	day	outpt	comm	o'night	day	outpt	comm	o'night	day	outpt	comm	
78	0	0	0	0	91	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**97**
79	87	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**95**
80	0	0	0	0	0	0	0	0	86	7	0	0	0	0	0	0	0	0	0	0	**93**
81	0	0	0	0	91	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**92**
82	0	0	0	20	0	0	0	3	0	0	0	2	0	0	1	37	0	1	0	24	**88**
83	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**85**
84	1	0	0	0	34	0	0	0	1	0	0	0	22	0	0	0	26	0	0	0	**84**
85	4	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	10	1	0	65	**83**
86	0	0	0	0	53	0	0	0	0	0	0	0	5	0	0	0	24	0	0	0	**82**
87	0	0	0	0	71	0	0	0	0	0	0	0	0	0	0	0	6	0	1	4	**82**
88	0	0	0	0	49	0	0	0	0	0	0	0	25	1	0	0	3	0	0	0	**78**
89	0	0	0	0	64	0	0	0	1	0	0	0	1	1	5	0	0	0	0	0	**72**
90	8	0	0	0	54	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	**64**
91	8	0	0	0	7	1	9	0	0	0	0	0	11	0	0	0	23	0	1	0	**60**
92	0	0	0	0	47	1	0	0	0	0	0	0	0	0	0	0	11	0	0	0	**59**
93	1	0	0	0	0	0	0	0	0	0	0	0	33	0	0	0	16	1	0	0	**51**
94	0	0	0	0	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**45**
95	1	0	0	0	0	0	0	0	26	0	0	0	0	0	0	0	18	0	0	0	**45**
96	0	0	0	0	0	0	0	7	0	0	0	1	0	0	0	16	0	0	0	18	**42**
97	0	0	0	1	8	0	0	0	0	0	0	0	28	0	2	0	0	0	0	0	**39**
98	0	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**38**
99	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	14	1	0	19	**37**
100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	0	0	24	**36**
101	0	0	0	0	24	0	0	0	0	0	0	0	5	0	0	0	6	0	0	0	**35**
102	0	0	0	0	15	0	0	0	0	0	0	0	0	0	0	0	16	0	0	0	**31**
103	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	0	0	0	**25**
104	1	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	**12**
TOTAL	**1977**	**50**	**150**	**2537**	**7387**	**594**	**1697**	**739**	**490**	**11**	**141**	**320**	**1919**	**256**	**657**	**2439**	**1346**	**53**	**849**	**6694**	**30306**
TOTAL CASE TYPE				4714				10417				962				5271				8942	**30306**
%	6.52	0.16	0.49	8.37	24.37	1.96	5.60	2.44	1.62	0.04	0.47	1.06	6.33	0.84	2.17	8.05	4.44	0.17	2.80	22.09	**100**
% CASE TYPE				15.55				34.37				3.17				17.39				29.51	**100.00**
% EXPECTED				15.50				36.00				4.24				20.60				23.60	**100.00**

Appendix 8
Study Cost Centre Structure
(Not included in PDF version of the report)

Appendix 9 Overhead allocation statistics used in the study

OVERHEAD ALLOCATION STATISTICS	
Allocation Statistic	***Label - Description***
1	General Ledger Costs
2	Salary and Wages Costs
3	Goods and Services Costs
4	Adjusted General Ledger Costs (Initial patient care cost centres only)
5	Actual Stores Issued
6	Full-time Equivalents
7	Nursing Full-time Equivalents
8	Medical Full-time Equivalents
9	Head Count
10	Nursing, Head Count
11	Medical, Head Count
12	Number of Discharges
13	Number of Patients Admitted
14	Number of Patients Treated
15	Number of Group Sessions
16	Occupied Beddays
17	Occasions of Service
18	Number of Patient Contacts
19	Floor Space (Sq Metres)
20	Floor Space * Frequency
21	Rostered Staff
22	Number of Meals Issued
23	Meals per Ward
24	Kilograms of Laundry by Cost Centre
25	Linen Usage (from Imprest Records)
26	Number of Computers by Cost Centre
27	Number of Vehicles by Cost Centre
28	Number of Telephone Lines Connected
29	Call Log by Cost Centre
30	Items sterilised by Cost Centre

Appendix 10

Training Evaluation Form
(not included in pdf version of the report)

Appendix 11

Site Survey Form
(not included in pdf version of the report)

Appendix 12

Episodes by Delineated Role of Study Sites

PALLIATIVE CARE EPISODES

Site Role in Palliative Care	OVERNIGHT	% OVERNIGHT	AMBULATORY	% AMBULATORY
LEVEL 0	9	0.48	0	0
LEVEL 1	99	5.30	74	2.71
LEVEL 2	280	14.99	1125	41.24
LEVEL 3	1480	79.23	1529	56.05
TOTAL	1868	100	2728	100

REHABILITATION EPISODES

Site Role in Rehabilitation	OVERNIGHT	% OVERNIGHT	AMBULATORY	% AMBULATORY
LEVEL 0	8	0.11	85	2.79
LEVEL 1	480	6.49	111	3.64
LEVEL 2	3205	43.33	1130	37.07
LEVEL 3	3704	50.07	1722	56.50
TOTAL	7397	100.00	3048	100.00

REHABILITATION EPISODES

Site Role in Geriatric Medicine	OVERNIGHT	% OVERNIGHT	AMBULATORY	% AMBULATORY
LEVEL 0	3147	42.54	1349	44.26
LEVEL 1	279	3.77	182	5.97
LEVEL 2	2021	27.32	431	14.14
LEVEL 3	1950	26.36	1086	35.63
TOTAL	7397	100.00	3048	100.00

PSYCHOGERIATRIC EPISODES

Site Role in Geriatric Psychiatry	OVERNIGHT	% OVERNIGHT	AMBULATORY	% AMBULATORY
LEVEL 0	4	0.84	0	0.00
LEVEL 1	69	14.41	60	12.55
LEVEL 2	108	22.55	310	64.85
LEVEL 3	298	62.21	108	22.59
TOTAL	479	100.00	478	100

GEM EPISODES

Site Role in Rehabilitation	OVERNIGHT	% OVERNIGHT	AMBULATORY	% AMBULATORY
LEVEL 0	95	5.05	228	6.80
LEVEL 1	121	6.43	234	6.98
LEVEL 2	312	16.58	591	17.62
LEVEL 3	1354	71.94	2301	68.60
TOTAL	1882	100.00	3354	100.00

GEM EPISODES

Site Role in Geriatric Medicine	OVERNIGHT	% OVERNIGHT	AMBULATORY	% AMBULATORY
LEVEL 0	33	1.75	27	0.89
LEVEL 1	224	11.90	241	7.91
LEVEL 2	636	33.79	577	18.93
LEVEL 3	989	52.55	2509	82.32
TOTAL	1882	100.00	3354	100.00

MAINTENANCE EPISODES

Site Role in Rehabilitation	OVERNIGHT	% OVERNIGHT	AMBULATORY	% AMBULATORY

LEVEL 0	196	12.52	4682	59.99
LEVEL 1	285	18.21	1257	16.11
LEVEL 2	433	27.67	1175	15.05
LEVEL 3	651	41.60	691	8.85
TOTAL	1565	100.00	7805	100.00

MAINTENANCE EPISODES

Site Role in Geriatric Medicine	OVERNIGHT	% OVERNIGHT	AMBULATORY	% AMBULATORY
LEVEL 0	226	14.44	858	10.99
LEVEL 1	455	29.07	4967	63.64
LEVEL 2	339	21.66	1252	16.04
LEVEL 3	545	34.82	728	9.33
TOTAL	1565	100.00	7805	100.00

MAINTENANCE EPISODES

Site Role in Community Health	OVERNIGHT	% OVERNIGHT	AMBULATORY	% AMBULATORY
LEVEL 0	824	52.65	260	3.33
LEVEL 1	89	5.69	295	3.78
LEVEL 2	421	26.90	6198	79.41
LEVEL 3	231	14.76	1052	13.48
TOTAL	1565	100.00	7805	100.00

EXPLANATORY NOTE

Number and percentage of episodes are those recorded by study sites during the data collection period
Definitions of each role level are those included in Appendix 4 and are based on Site Survey included as Appendix 11

Appendix 13

AN-SNAP Version 1 Classes

Class	Case Type	Episode Type	Description	core episode cost	episode cost weight	SD of episode cost	CV of episode cost	ALOS (days)	core day cost	per diem cost weight
101	Palliative Care	Overnight	Stable, RUG 4	$1,980	0.45	$1,710	0.86	9.38	$211	0.86
102	Palliative Care	Overnight	Stable, RUG 5-17	$2,953	0.67	$2,299	0.78	11.10	$266	1.08
103	Palliative Care	Overnight	Stable, RUG 18	$3,169	0.72	$2,542	0.80	10.24	$309	1.26
104	Palliative Care	Overnight	Unstable, RUG 4-17	$2,338	0.53	$2,047	0.88	9.01	$260	1.06
105	Palliative Care	Overnight	Unstable, RUG 18	$1,707	0.39	$1,805	1.06	5.34	$320	1.30
106	Palliative Care	Overnight	Deteriorating, RUG 4-17	$2,193	0.50	$2,069	0.94	7.88	$278	1.13
107	Palliative Care	Overnight	Deteriorating, RUG 18, age <=71	$2,066	0.47	$2,168	1.05	5.91	$350	1.43
108	Palliative Care	Overnight	Deteriorating, RUG 18, age >=72	$1,367	0.31	$1,660	1.21	4.50	$303	1.24
109	Palliative Care	Overnight	Terminal, RUG 4-16	$1,280	0.29	$1,611	1.26	4.30	$298	1.21
110	Palliative Care	Overnight	Terminal, RUG 17-18	$945	0.22	$1,086	1.15	3.01	$313	1.28
111	Palliative Care	Overnight	Bereavement	$327	0.07	$265	0.81	1.00	$327	1.33
201	Rehabilitation	Overnight	Admit for assessment only	$1,188	0.27	$2,735	2.30	4.42	$269	1.10
202	Rehabilitation	Overnight	Brain, Neuro, Spine and MMT, FIM 13	$29,186	6.67	$20,273	0.69	57.17	$511	2.08
203	Rehabilitation	Overnight	All other impairments, FIM 13	$9,324	2.13	$7,273	0.78	25.11	$371	1.51
204	Rehabilitation	Overnight	Stroke and Burns, motor 63-91, cognition 20-35	$4,715	1.08	$3,836	0.81	18.11	$260	1.06
205	Rehabilitation	Overnight	Stroke and Burns, motor 63-91, cognition 5-19	$6,835	1.56	$6,682	0.98	21.91	$312	1.27
206	Rehabilitation	Overnight	Stroke and Burns, motor 47-62	$7,101	1.62	$5,246	0.74	26.38	$269	1.10
207	Rehabilitation	Overnight	Stroke and Burns, motor 14-46, age>=75	$8,633	1.97	$7,307	0.85	29.70	$291	1.19
208	Rehabilitation	Overnight	Stroke and Burns, motor 14-46, age<=74	$13,057	2.98	$9,238	0.71	40.66	$321	1.31
209	Rehabilitation	Overnight	Brain Dysfunction, motor 71-91	$4,429	1.01	$3,968	0.90	17.06	$260	1.06
210	Rehabilitation	Overnight	Brain Dysfunction, motor 29-70, age>=55	$6,153	1.41	$3,994	0.65	23.53	$262	1.07
211	Rehabilitation	Overnight	Brain Dysfunction, motor 29-70, age<=54	$11,086	2.53	$10,300	0.93	35.41	$313	1.28
212	Rehabilitation	Overnight	Brain Dysfunction, motor 14-28	$21,340	4.88	$12,927	0.61	58.64	$364	1.48
213	Rehabilitation	Overnight	Neurological, motor 74-91	$3,534	0.81	$2,340	0.66	16.21	$218	0.89
214	Rehabilitation	Overnight	Neurological, motor 41-73	$5,689	1.30	$4,076	0.72	20.74	$274	1.12
215	Rehabilitation	Overnight	Neurological, motor 14-40	$8,344	1.91	$6,023	0.72	28.08	$297	1.21
216	Rehabilitation	Overnight	Spinal Cord Dysfunction, motor 81-91	$2,709	0.62	$2,112	0.78	13.50	$201	0.82
217	Rehabilitation	Overnight	Spinal Cord Dysfunction, motor 47-80	$7,635	1.74	$7,255	0.95	26.82	$285	1.16
218	Rehabilitation	Overnight	Spinal Cord Dysfunction, motor 14-46	$18,470	4.22	$12,302	0.67	44.65	$414	1.69
219	Rehabilitation	Overnight	Amputation of limb, motor 66-91	$5,069	1.16	$3,970	0.78	23.23	$218	0.89
220	Rehabilitation	Overnight	Amputation of limb, motor 47-65	$8,674	1.98	$7,349	0.85	32.97	$263	1.07

Class	Case Type	Episode Type	Description	core episode cost	episode cost weight	SD of episode cost	CV of episode cost	ALOS (days)	core day cost	per diem cost weight
221	Rehabilitation	Overnight	Amputation of limb, motor 14-46	$9,915	2.27	$7,118	0.72	32.68	$303	1.24
222	Rehabilitation	Overnight	Pain Syndromes	$3,352	0.77	$2,243	0.67	15.37	$218	0.89
223	Rehabilitation	Overnight	Orthopaedic conditions, motor 74-91	$2,814	0.64	$1,768	0.63	14.05	$200	0.82
224	Rehabilitation	Overnight	Orthopaedic conditions, motor 58-73	$4,295	0.98	$2,710	0.63	18.77	$229	0.93
225	Rehabilitation	Overnight	Orthopaedic conditions, motor 52-57	$5,687	1.30	$3,760	0.66	23.37	$243	0.99
226	Rehabilitation	Overnight	Orthopaedic conditions, motor 14-51	$7,175	1.64	$4,756	0.66	25.81	$278	1.13
227	Rehabilitation	Overnight	Cardiac	$4,930	1.13	$2,833	0.57	19.51	$253	1.03
228	Rehabilitation	Overnight	Major Multiple Trauma	$7,031	1.61	$7,053	1.00	22.52	$312	1.27
229	Rehabilitation	Overnight	All other impairments, motor 67-91	$3,268	0.75	$2,197	0.67	16.04	$204	0.83
230	Rehabilitation	Overnight	All other impairments, motor 53-66	$4,562	1.04	$3,703	0.81	18.18	$251	1.02
231	Rehabilitation	Overnight	All other impairments, motor 25-52	$5,521	1.26	$3,598	0.65	20.84	$265	1.08
232	Rehabilitation	Overnight	All other impairments, motor 14-24	$7,861	1.80	$8,010	1.02	28.46	$276	1.13
301	Psychogeriatric	Overnight	HoNOS Overactive behaviour 4,5	$8,105	1.85	$5,429	0.67	24.98	$324	1.32
302	Psychogeriatric	Overnight	HoNOS Overactive behaviour 2,3, ADL 5	$7,602	1.74	$5,277	0.69	22.19	$343	1.40
303	Psychogeriatric	Overnight	HoNOS Overactive behaviour 2,3, ADL 1-4	$5,956	1.36	$4,401	0.74	21.10	$282	1.15
304	Psychogeriatric	Overnight	HoNOS Overactive behaviour 1, HoNOS total>=30	$6,163	1.41	$4,037	0.66	22.44	$275	1.12
305	Psychogeriatric	Overnight	HoNOS Overactive behaviour 1, HoNOS total<=29	$4,289	0.98	$3,806	0.89	17.98	$239	0.97
306	Psychogeriatric	Overnight	Long term care	$15,235	3.48	$3,433	0.23	88.94	$171	0.70
401	GEM	Overnight	Cognition<=15, motor 13-43	$5,068	1.16	$3,529	0.70	20.40	$248	1.01
402	GEM	Overnight	Cognition<=15, motor 44-91, age>=84	$4,775	1.09	$3,938	0.82	20.05	$238	0.97
403	GEM	Overnight	Cognition<=15, motor 44-91, age<=83	$3,006	0.69	$1,690	0.56	15.88	$189	0.77
404	GEM	Overnight	Cognition 16-35, motor 13-50	$3,790	0.87	$3,213	0.85	17.75	$214	0.87
405	GEM	Overnight	Cognition 16-35, motor 51-77	$3,166	0.72	$2,526	0.80	17.02	$186	0.76
406	GEM	Overnight	Cognition 16-35, motor 78-91	$2,115	0.48	$2,053	0.97	13.81	$153	0.62
501	Maintenance	Overnight	Respite, RUG 15-18	$4,022	0.92	$2,215	0.55	14.94	$269	1.10
502	Maintenance	Overnight	Respite, RUG 5-14	$3,082	0.70	$1,821	0.59	13.64	$226	0.92
503	Maintenance	Overnight	Respite, RUG 4	$2,077	0.47	$1,808	0.87	12.82	$162	0.66
504	Maintenance	Overnight	Nursing Home Type, RUG 11-18	$4,780	1.09	$4,650	0.97	20.27	$236	0.96
505	Maintenance	Overnight	Nursing Home Type, RUG 4-10	$3,986	0.91	$4,300	1.08	19.49	$205	0.83
506	Maintenance	Overnight	Convalescent care	$2,003	0.46	$5,073	2.53	10.92	$184	0.75
507	Maintenance	Overnight	Other Maintenance, RUG 14-18	$2,532	0.58	$15,949	6.30	19.67	$129	0.52

Class	Case Type	Episode Type	Description	core episode cost	episode cost weight	SD of episode cost	CV of episode cost	ALOS (days)	core day cost	per diem cost weight
508	Maintenance	Overnight	Other Maintenance, RUG 4-13	$4,236	0.97	$5,401	1.28	18.64	$227	0.93
509	Maintenance	Overnight	Long term care, RUG 17-18	$14,698	3.36	$5,714	0.39	90.27	$163	0.66
510	Maintenance	Overnight	Long term care, RUG 10-16	$12,943	2.96	$6,219	0.48	91.32	$142	0.58
511	Maintenance	Overnight	Long term care, RUG 4-9	$9,213	2.11	$4,845	0.53	91.22	$101	0.41
151	Palliative Care	All ambulatory	Medical only	$157	0.31	$129	0.82	1.49	$105	1.59
152	Palliative Care	All ambulatory	Therapies only	$254	0.50	$381	1.50	4.26	$60	0.90
153	Palliative Care	All ambulatory	Stable, Multidisciplinary	$987	1.94	$922	0.93	11.16	$88	1.34
154	Palliative Care	All ambulatory	Stable, Nursing only, severity<=10, RUG 4, age>=67	$330	0.65	$380	1.15	5.88	$56	0.85
155	Palliative Care	All ambulatory	Stable, Nursing only, severity<=10, RUG 4, age<=66	$483	0.95	$668	1.38	6.70	$72	1.09
156	Palliative Care	All ambulatory	Stable, Nursing only, severity<=10, RUG 5-18	$696	1.37	$956	1.37	7.83	$89	1.35
157	Palliative Care	All ambulatory	Stable, Nursing only, severity>=11	$704	1.38	$917	1.30	7.29	$97	1.46
158	Palliative Care	All ambulatory	Unstable, Multidisciplinary, RUG 4, severity<=11	$568	1.12	$493	0.87	7.72	$74	1.11
159	Palliative Care	All ambulatory	Unstable, Multidisciplinary, RUG 4, severity>=12	$834	1.64	$1,026	1.23	10.11	$83	1.25
160	Palliative Care	All ambulatory	Unstable, Multidisciplinary, RUG 5-18	$832	1.63	$1,730	2.08	7.98	$104	1.58
161	Palliative Care	All ambulatory	Unstable, Nursing only, RUG<=14, age>=60	$372	0.73	$422	1.14	5.17	$72	1.09
162	Palliative Care	All ambulatory	Unstable, Nursing only, RUG<=14, age<=59	$631	1.24	$801	1.27	7.22	$87	1.32
163	Palliative Care	All ambulatory	Unstable, Nursing only, RUG>=15	$879	1.73	$1,205	1.37	7.94	$111	1.68
164	Palliative Care	All ambulatory	Deteriorating, Multidisciplinary, severity <=10	$626	1.23	$512	0.82	7.43	$84	1.28
165	Palliative Care	All ambulatory	Deteriorating, Multidisciplinary, severity>=11, RUG<=10	$731	1.44	$669	0.92	8.94	$82	1.24
166	Palliative Care	All ambulatory	Deteriorating, Multidisciplinary, severity>=11, RUG>=11	$969	1.90	$1,327	1.37	8.14	$119	1.80
167	Palliative Care	All ambulatory	Deteriorating, Nursing only, RUG 4	$410	0.81	$447	1.09	6.33	$65	0.98
168	Palliative Care	All ambulatory	Deteriorating, Nursing only, RUG 5-18	$501	0.98	$877	1.75	4.81	$104	1.58
169	Palliative Care	All ambulatory	Terminal, Multidisciplinary	$630	1.24	$954	1.51	4.59	$137	2.08
170	Palliative Care	All ambulatory	Terminal, Nursing only	$381	0.75	$483	1.27	3.02	$126	1.91
171	Palliative Care	All ambulatory	Bereavement, age >=45	$152	0.30	$219	1.44	1.00	$152	2.30
172	Palliative Care	All ambulatory	Bereavement, age <=44	$504	0.99	$1,132	2.24	1.00	$504	7.63
251	Rehabilitation	Same Day	Brain, MMT & Pulmonary	$3,194	6.28	$3,011	0.94	28.00	$114	1.73
252	Rehabilitation	Same Day	Burns, Cardiac, Pain, Spine, & Neuro	$1,142	2.24	$1,171	1.03	9.50	$120	1.82
253	Rehabilitation	Same Day	All other impairments	$1,686	3.31	$1,568	0.93	13.70	$123	1.86
254	Rehabilitation	Outpatient & Community	Assess, Medical Only	$60	0.12	$48	0.81	1.07	$56	0.84
255	Rehabilitation	Outpatient & Community	Assess, Multidisciplinary	$198	0.39	$465	2.35	2.81	$70	1.07

Class	Case Type	Episode Type	Description	core episode cost	episode cost weight	SD of episode cost	CV of episode cost	ALOS (days)	core day cost	per diem cost weight
256	Rehabilitation	Outpatient & Community	Treat, Medical Only	$61	0.12	$33	0.54	1.15	$53	0.80
257	Rehabilitation	Outpatient & Community	Amputation	$2,538	4.99	$2,224	0.88	18.00	$141	2.13
258	Rehabilitation	Outpatient & Community	Brain Injury and MMT	$1,496	2.94	$2,047	1.37	13.94	$107	1.62
259	Rehabilitation	Outpatient & Community	Spinal Injury	$543	1.07	$1,666	3.07	8.93	$61	0.92
260	Rehabilitation	Outpatient & Community	Stroke and DD, Sole Practitioner	$574	1.13	$633	1.10	6.91	$83	1.26
261	Rehabilitation	Outpatient & Community	Stroke and DD, Multidisciplinary, FIM Motor <=80	$1,116	2.19	$1,184	1.06	10.88	$103	1.55
262	Rehabilitation	Outpatient & Community	Stroke and DD, Multidisciplinary, FIM Motor >=81	$1,255	2.47	$1,417	1.13	12.07	$104	1.57
263	Rehabilitation	Outpatient & Community	All other impairments, Sole Practitioner	$433	0.85	$412	0.95	6.70	$65	0.98
264	Rehabilitation	Outpatient & Community	All other impairments, Multidisciplinary, FIM Motor <=80	$881	1.73	$871	0.99	10.19	$86	1.31
265	Rehabilitation	Outpatient & Community	All other impairments, Multidisciplinary, FIM Motor >=81	$651	1.28	$597	0.92	10.12	$64	0.97
351	Psychogeriatric	Outpatient	Assessment Only	$191	0.38	$222	1.16	1.79	$107	1.62
352	Psychogeriatric	Community	Assessment Only	$106	0.21	$82	0.78	1.87	$56	0.85
353	Psychogeriatric	All ambulatory	Treat, Acute Phase	$425	0.84	$473	1.11	8.50	$50	0.76
354	Psychogeriatric	All ambulatory	Treat, All Other Phases, HoNOS total <=20	$91	0.18	$76	0.83	2.56	$36	0.54
355	Psychogeriatric	All ambulatory	Treat, All Other Phases, HoNOS total 21-25	$180	0.35	$167	0.93	3.59	$50	0.76
356	Psychogeriatric	All ambulatory	Treat, All Other, HoNOS total >=26, HoNOS Overactive 1,2	$357	0.70	$423	1.18	7.85	$46	0.69
357	Psychogeriatric	All ambulatory	Treat, All Other, HoNOS total >=26, HoNOS Overactive 3,4,5	$177	0.35	$194	1.10	2.87	$62	0.93
451	GEM	Same Day	Assessment Only	$425	0.83	$551	1.30	2.64	$161	2.44
452	GEM	Outpatients & Community	Assess, Medical Only	$116	0.23	$100	0.87	1.33	$87	1.31
453	GEM	Outpatients & Community	Assess, Multidisciplinary	$195	0.38	$224	1.15	2.66	$73	1.11
454	GEM	Same Day	All Sameday	$1,716	3.37	$1,416	0.83	17.67	$97	1.47
455	GEM	Outpatients & Community	FIM Motor <=40	$886	1.74	$1,203	1.36	11.85	$75	1.13
456	GEM	Outpatients & Community	FIM Motor 41-56	$664	1.30	$700	1.05	9.50	$70	1.06
457	GEM	Outpatients & Community	FIM Motor>=57, Sole Practitioner	$528	1.04	$222	0.42	8.79	$60	0.91
458	GEM	Outpatients & Community	FIM Motor>=57, Multidisciplinary	$368	0.72	$554	1.51	5.94	$62	0.94
551	Maintenance	All ambulatory	Medical Only, all	$77	0.15	$49	0.64	1.80	$43	0.65
552	Maintenance	All ambulatory	Assess, Nursing	$157	0.31	$205	1.18	2.79	$62	0.94
553	Maintenance	All ambulatory	Assess, Psychosocial	$174	0.34	$191	1.61	2.74	$43	0.66
554	Maintenance	All ambulatory	Assess, Physical Therapy	$119	0.23	$159	0.42	3.97	$95	1.43
555	Maintenance	Same Day & Community	Assess, Multidisciplinary	$376	0.74	$963	4.24	3.97	$57	0.87

Class	Case Type	Episode Type	Description	core episode cost	episode cost weight	SD of episode cost	CV of episode cost	ALOS (days)	core day cost	per diem cost weight
556	Maintenance	Outpatient	Assess, Multidisciplinary	$227	0.45	$432	0.75	3.05	$188	2.85
557	Maintenance	All ambulatory	Maintenance & Support, Nursing, age>=37, RUG>=5	$574	1.13	$659	1.25	13.12	$40	0.61
558	Maintenance	All ambulatory	Maintenance & Support, Nursing, age>=37, RUG 4	$529	1.04	$589	0.91	13.53	$48	0.72
559	Maintenance	All ambulatory	Maintenance & Support, Nursing, age<=36, RUG>=5	$646	1.27	$653	3.89	15.14	$11	0.17
560	Maintenance	All ambulatory	Maintenance & Support, Nursing, age<=36, RUG 4	$168	0.33	$340	1.02	7.52	$44	0.67
561	Maintenance	All ambulatory	Maintenance & Support, Physical Therapy, RUG>=6	$334	0.66	$591	2.12	7.11	$39	0.59
562	Maintenance	All ambulatory	Maintenance & Support, Physical Therapy, RUG 4,5	$279	0.55	$246	0.28	6.51	$135	2.05
563	Maintenance	Community	Maintenance & Support, Multidisc., age>=27, RUG 4-11	$882	1.73	$908	0.70	17.67	$74	1.12
564	Maintenance	All ambulatory	Maintenance & Support, Multidisc., age>=27, RUG>=12	$1,305	2.56	$457	0.84	21.03	$26	0.39
565	Maintenance	Outpatient	Maintenance & Support, Multidisc., age>=27, RUG 4-11	$542	1.06	$1,533	3.34	7.68	$60	0.90
566	Maintenance	All ambulatory	Maintenance & Support, Multidisc., <=26 yrs	$458	0.90	$655	1.43	8.99	$0	0.00

ALOE Average length of episode - ambulatory episodes
ALOS Average length of stay - overnight episodes
COST WEIGHT Cost relative to all overnight episodes or all ambulatory episodes, depending on the class

Appendix 14 Service Costs by AN-SNAP Version 1 Classes
Explanatory notes

1 Core Cost is defined as the total of Nursing, Physical Therapies, Psychosocial, Other Staff, good and services, and medical and surgical supplies (the first six cost buckets).

2 Palliative Care - Core cost for each phase is based on actual core cost recorded. All cost buckets are derived by proportioning each cost item for each episode between the phases within that episode in proportion to beddays (overnights) and contact days (ambulatory).

3 Imaging - Costs based on frequency and type of test reported for patients in each class using only data from those sites with accurate information systems. Some classes had low numbers of episodes from such sites.

4 Pathology - Costs based on frequency and type of test reported for patients in each class using only data from those sites with accurate information systems. Some classes had low numbers of episodes from such sites.

5 Drugs - Costs based on actual drug costs for patients in each class using only data from those sites with accurate information systems. Some classes had low numbers of episodes from such sites. Clinical pharmacist costs are included in “Other Staff”.

6 Capital - Costs based on capital costs reported from those sites (public and private) able to report capital and depreciation costs. If a site had episodes of more than one Case Type, capital costs were split between the Case Types in proportion to the average sum of physical therapies, psychosocial and other staff time. This method was used because it recognised that major capital costs are incurred in the provision of therapy services, including equipment, hydrotherapy pools and gymnasiums. For all Case Types except Psychogeriatrics, the capital cost per day was derived by removing the two sites with the highest and the two sites with the lowest capital costs and then calculating the mean of the remaining sites. Only one site that reported capital costs had any psychogeriatric

episodes. Capital costs for psychogeriatrics were therefore calculated by applying the capital rate for Geriatric Evaluation and Management episodes. If a site provided both overnight and ambulatory care, capital costs were split between overnight and ambulatory episodes using this same approach. A standard capital cost per overnight bed day and per ambulatory contact day was derived for Rehabilitation using this method. The ratio between overnight and ambulatory rehabilitation capital costs (69:31) was then applied to all other Case Types. This method was used because the number of sites that provided both overnight amd ambulatory care and that reported capital costs was insufficient for the determination of separate ratios for the other Case Types. The standard capital rates derived using this method were:

Overnight palliative care	$17.45 per bed day
Overnight rehabilitation	$24.06 per bed day
Overnight psychogeriatrics	$18.97 per bed day
Overnight GEM	$18.97 per bed day
Overnight maintenance	$11.92 per bed day
Ambulatory palliative care	$12.04 per contact day
Ambulatory rehabilitation	$16.60 per contact day
Ambulatory psychogeriatrics	$13.09 per contact day
Ambulatory GEM	$13.09 per contact day
Ambulatory maintenance	$8.22 per contact day

7 Volunteer and Student Time - Time is reported in minutes and is not included in the costs of each class.

8 Medical Cost - Cost based on a standard hourly rate of $52.90 per hour as outlined in Section 6.1 of the report.

Class	Episode Type	Description	Final Cost per Episode excluding medical	Final Cost per Episode including medical	Final Cost per Day excluding medical	Final Cost per Day including medical
PALLIATIVE CARE						
101	Overnight	Stable, RUG 4	$2,422.02	$2,800.68	$258.08	$298.43
102	Overnight	Stable, RUG 5-17	$3,351.98	$3,917.22	$300.78	$351.50
103	Overnight	Stable, RUG 18	$3,564.59	$4,206.53	$348.10	$410.79
104	Overnight	Unstable, RUG 4-17	$2,701.51	$3,201.08	$299.95	$355.42
105	Overnight	Unstable, RUG 18	$1,950.43	$2,410.98	$365.20	$451.44
106	Overnight	Deteriorating, RUG 4-17	$2,502.38	$3,013.69	$317.58	$382.47
107	Overnight	Deteriorating, RUG 18, age <=71	$2,297.60	$2,828.61	$388.93	$478.81
108	Overnight	Deteriorating, RUG 18, age >=72	$1,580.73	$1,965.24	$351.00	$436.38
109	Overnight	Terminal, RUG 4-16	$1,449.55	$1,952.44	$337.22	$454.21
110	Overnight	Terminal, RUG 17-18	$1,055.77	$1,437.78	$363.85	$495.50
111	Overnight	Bereavement	$344.27	$749.57	not applicable	not applicable
151	All ambulatory	Medical only	$29.41	$178.58	$19.78	$120.13
152	All ambulatory	Therapies only	$265.07	$414.39	$69.40	$108.49
153	All ambulatory	Stable, Multidisciplinary	$1,089.87	$1,233.52	$93.26	$105.55
154	All ambulatory	Stable, Nursing only, severity<=10, RUG 4, age>=67	$398.47	$474.22	$67.79	$80.67
155	All ambulatory	Stable, Nursing only, severity<=10, RUG 4, age<=66	$565.09	$672.26	$84.30	$100.29
156	All ambulatory	Stable, Nursing only, severity<=10, RUG 5-18	$811.46	$866.31	$103.59	$110.59
157	All ambulatory	Stable, Nursing only, severity>=11	$811.37	$913.59	$111.24	$125.25
158	All ambulatory	Unstable, Multidisciplinary, RUG 4, severity<=11	$630.21	$783.02	$81.61	$101.40
159	All ambulatory	Unstable, Multidisciplinary, RUG 4, severity>=12	$982.74	$1,049.75	$94.85	$101.32
160	All ambulatory	Unstable, Multidisciplinary, RUG 5-18	$918.88	$1,061.59	$115.17	$133.06
161	All ambulatory	Unstable, Nursing only, RUG<=14, age>=60	$446.54	$514.32	$86.37	$99.48
162	All ambulatory	Unstable, Nursing only, RUG<=14, age<=59	$766.33	$829.85	$106.14	$114.94
163	All ambulatory	Unstable, Nursing only, RUG>=15	$990.07	$1,045.49	$124.68	$131.65
164	All ambulatory	Deteriorating, Multidisciplinary, severity <=10	$703.64	$798.04	$89.91	$101.97

Class	Episode Type	Description	Final Cost per Episode excluding medical	Final Cost per Episode including medical	Final Cost per Day excluding medical	Final Cost per Day including medical
165	All ambulatory	Deteriorating, Multidisciplinary, severity>=11, RUG<=10	$815.40	$1,064.92	$91.23	$119.15
166	All ambulatory	Deteriorating, Multidisciplinary, severity>=11, RUG>=11	$1,056.71	$1,188.28	$129.82	$145.98
167	All ambulatory	Deteriorating, Nursing only, RUG 4	$492.26	$538.55	$77.73	$85.03
168	All ambulatory	Deteriorating, Nursing only, RUG 5-18	$552.88	$633.49	$117.55	$134.68
169	All ambulatory	Terminal, Multidisciplinary	$675.33	$803.62	$147.21	$175.18
170	All ambulatory	Terminal, Nursing only	$412.82	$462.79	$136.83	$153.39
171	All ambulatory	Bereavement, age >=45	$156.95	$224.16	not applicable	not applicable
172	All ambulatory	Bereavement, age <=44	$480.13	$579.98	not applicable	not applicable
REHABILITATION						
201	Overnight	Admit for assessment only	$1,361.09	$1,551.37	$307.86	$350.91
202	Overnight	Brain, Neuro, Spine and MMT, FIM 13	$31,336.47	$32,075.38	$543.01	$555.82
203	Overnight	All other impairments, FIM 13	$10,576.95	$11,051.10	$405.89	$424.08
204	Overnight	Stroke and Burns, motor 63-91, cognition 20-35	$5,643.43	$5,922.19	$310.49	$325.82
205	Overnight	Stroke and Burns, motor 63-91, cognition 5-19	$7,801.91	$8,139.49	$356.02	$371.42
206	Overnight	Stroke and Burns, motor 47-62	$8,237.97	$8,581.49	$305.63	$318.37
207	Overnight	Stroke and Burns, motor 14-46, age>=75	$10,035.76	$10,484.25	$333.60	$348.51
208	Overnight	Stroke and Burns, motor 14-46, age<=74	$14,771.97	$15,209.07	$349.12	$359.45
209	Overnight	Brain Dysfunction, motor 71-91	$5,300.45	$5,711.59	$307.33	$331.17
210	Overnight	Brain Dysfunction, motor 29-70, age>=55	$7,140.13	$7,537.99	$299.12	$315.79
211	Overnight	Brain Dysfunction, motor 29-70, age<=54	$12,470.94	$12,916.45	$358.12	$370.91
212	Overnight	Brain Dysfunction, motor 14-28	$23,451.15	$24,099.45	$399.94	$411.00
213	Overnight	Neurological, motor 74-91	$4,299.97	$4,518.08	$262.50	$275.81
214	Overnight	Neurological, motor 41-73	$6,523.30	$6,812.40	$314.19	$328.11
215	Overnight	Neurological, motor 14-40	$9,839.97	$10,287.43	$350.38	$366.32
216	Overnight	Spinal Cord Dysfunction, motor 81-91	$3,519.90	$3,794.88	$260.73	$281.10

Class	Episode Type	Description	Final Cost per Episode excluding medical	Final Cost per Episode including medical	Final Cost per Day excluding medical	Final Cost per Day including medical
217	Overnight	Spinal Cord Dysfunction, motor 47-80	$8,823.54	$9,304.91	$329.01	$346.96
218	Overnight	Spinal Cord Dysfunction, motor 14-46	$20,241.74	$20,708.21	$428.16	$438.03
219	Overnight	Amputation of limb, motor 66-91	$6,055.10	$6,335.67	$255.32	$267.15
220	Overnight	Amputation of limb, motor 47-65	$10,128.40	$10,556.46	$307.18	$320.16
221	Overnight	Amputation of limb, motor 14-46	$11,355.27	$11,921.66	$337.89	$354.75
222	Overnight	Pain Syndromes	$4,195.34	$4,380.13	$269.53	$281.40
223	Overnight	Orthopaedic conditions, motor 74-91	$3,426.29	$3,623.20	$242.80	$256.75
224	Overnight	Orthopaedic conditions, motor 58-73	$5,108.26	$5,349.81	$270.03	$282.80
225	Overnight	Orthopaedic conditions, motor 52-57	$6,713.80	$7,024.82	$287.33	$300.64
226	Overnight	Orthopaedic conditions, motor 14-51	$8,321.02	$8,673.19	$315.97	$329.34
227	Overnight	Cardiac	$5,759.25	$5,995.21	$295.16	$307.25
228	Overnight	Major Multiple Trauma	$8,380.37	$8,747.82	$372.19	$388.51
229	Overnight	All other impairments, motor 67-91	$4,155.28	$4,395.84	$258.43	$273.39
230	Overnight	All other impairments, motor 53-66	$5,427.43	$5,705.57	$293.78	$308.83
231	Overnight	All other impairments, motor 25-52	$6,681.89	$7,040.71	$314.99	$331.90
232	Overnight	All other impairments, motor 14-24	$9,063.44	$9,387.10	$318.45	$329.82
251	Same Day	Brain, MMT & Pulmonary	$3,896.24	$3,983.92	$139.15	$142.28
252	Same Day	Burns, Cardiac, Pain, Spine, & Neuro	$1,487.31	$1,593.39	$156.56	$167.72
253	Same Day	All other impairments	$2,112.62	$2,232.01	$153.89	$162.59
254	Outpatient & Community	Assess, Medical Only	$205.46	$261.64	$193.79	$246.77
255	Outpatient & Community	Assess, Multidisciplinary	$388.17	$495.16	$145.18	$185.19
256	Outpatient & Community	Treat, Medical Only	$29.63	$87.58	$26.46	$78.20
257	Outpatient & Community	Amputation	$2,868.06	$2,988.62	$155.96	$162.51
258	Outpatient & Community	Brain Injury and MMT	$1,826.69	$1,977.00	$131.02	$141.80
259	Outpatient & Community	Spinal Injury	$834.88	$950.38	$103.16	$117.43
260	Outpatient & Community	Stroke and DD, Sole Practitioner	$695.96	$770.90	$100.73	$111.58

Class	Episode Type	Description	Final Cost per Episode excluding medical	Final Cost per Episode including medical	Final Cost per Day excluding medical	Final Cost per Day including medical
261	Outpatient & Community	Stroke and DD, Multidisciplinary, FIM Motor <=80	$1,502.57	$1,663.00	$134.50	$148.86
262	Outpatient & Community	Stroke and DD, Multidisciplinary, FIM Motor >=81	$1,458.25	$1,597.44	$119.34	$130.73
263	Outpatient & Community	All other impairments, Sole Practitioner	$546.00	$640.90	$81.44	$95.60
264	Outpatient & Community	All other impairments, Multidisciplinary, FIM Motor <=80	$1,345.12	$1,525.01	$132.00	$149.65
265	Outpatient & Community	All other impairments, Multidisciplinary, FIM Motor >=81	$1,251.42	$1,354.70	$123.31	$133.49
PSYCHOGERIATRIC						
301	Overnight	HoNOS Overactive behaviour 4,5	$9,105.87	$9,857.99	$364.49	$394.60
302	Overnight	HoNOS Overactive behaviour 2,3, ADL 5	$8,570.29	$8,977.86	$386.31	$404.68
303	Overnight	HoNOS Overactive behaviour 2,3, ADL 1-4	$6,785.96	$7,181.64	$321.64	$340.39
304	Overnight	HoNOS Overactive behaviour 1, HoNOS total>=30	$7,167.62	$7,955.31	$319.47	$354.58
305	Overnight	HoNOS Overactive behaviour 1, HoNOS total<=29	$5,016.87	$5,462.14	$274.77	$299.15
306	Overnight	Long term care	$17,378.43	$17,574.26	$195.26	$197.46
351	Outpatient	Assessment Only	$282.36	$396.09	$157.59	$221.07
352	Community	Assessment Only	$132.74	$132.74	$70.91	$70.91
353	All ambulatory	Treat, Acute Phase	$539.67	$561.71	$71.46	$74.38
354	All ambulatory	Treat, All Other Phases, HoNOS total <=20	$120.57	$168.45	$47.12	$65.83
355	All ambulatory	Treat, All Other Phases, HoNOS total 21-25	$216.37	$383.01	$60.28	$106.70
356	All ambulatory	Treat, All Other, HoNOS total >=26, HoNOS Overactive 1,2	$468.01	$607.31	$59.63	$77.38
357	All ambulatory	Treat, All Other, HoNOS total >=26, HoNOS Overactive 3,4,5	$183.27	$308.35	$62.79	$105.64
GERIATRIC EVALUATION AND MANAGEMENT						
401	Overnight	Cognition<=15, motor 13-43	$6,227.64	$6,643.15	$302.25	$322.41
402	Overnight	Cognition<=15, motor 44-91, age>=84	$5,633.35	$6,029.59	$255.51	$273.48
403	Overnight	Cognition<=15, motor 44-91, age<=83	$3,966.79	$4,238.85	$241.88	$258.47
404	Overnight	Cognition 16-35, motor 13-50	$4,954.26	$5,369.70	$277.80	$301.09

Class	Episode Type	Description	Final Cost per Episode excluding medical	Final Cost per Episode including medical	Final Cost per Day excluding medical	Final Cost per Day including medical
405	Overnight	Cognition 16-35, motor 51-77	$4,098.82	$4,451.55	$236.60	$256.96
406	Overnight	Cognition 16-35, motor 78-91	$2,841.00	$3,145.18	$205.74	$227.77
451	Same Day	Assessment Only	$576.43	$696.32	$233.69	$282.29
452	Outpatients & Community	Assess, Medical Only	$292.55	$415.93	$230.59	$327.84
453	Outpatients & Community	Assess, Multidisciplinary	$390.13	$508.15	$151.57	$197.42
454	Same Day	All Sameday	$2,227.74	$2,376.08	$126.06	$134.45
455	Outpatients & Community	FIM Motor <=40	$1,267.12	$1,885.28	$107.89	$160.52
456	Outpatients & Community	FIM Motor 41-56	$735.76	$1,218.41	$77.45	$128.25
457	Outpatients & Community	FIM Motor>=57, Sole Practitioner	$725.46	$967.07	$82.92	$110.54
458	Outpatients & Community	FIM Motor>=57, Multidisciplinary	$441.30	$800.80	$77.50	$140.64
MAINTENANCE						
501	Overnight	Respite, RUG 15-18	$4,507.96	$4,649.70	$289.61	$298.71
502	Overnight	Respite, RUG 5-14	$3,461.96	$3,615.27	$244.14	$254.95
503	Overnight	Respite, RUG 4	$2,437.19	$2,590.60	$190.05	$202.01
504	Overnight	Nursing Home Type, RUG 11-18	$5,384.97	$5,604.41	$263.18	$273.90
505	Overnight	Nursing Home Type, RUG 4-10	$4,568.58	$4,786.17	$230.69	$241.68
506	Overnight	Convalescent care	$2,374.03	$2,522.71	$233.38	$248.00
507	Overnight	Other Maintenance, RUG 14-18	$3,099.45	$3,225.92	$268.96	$279.93
508	Overnight	Other Maintenance, RUG 4-13	$5,011.13	$5,154.96	$268.85	$276.57
509	Overnight	Long term care, RUG 17-18	$16,745.11	$16,862.66	$183.50	$184.78
510	Overnight	Long term care, RUG 10-16	$15,220.21	$15,405.33	$166.73	$168.76
511	Overnight	Long term care, RUG 4-9	$11,103.55	$11,242.72	$121.74	$123.27
551	All ambulatory	Medical Only, all	$50.44	$126.38	$45.05	$112.87
552	All ambulatory	Assess, Nursing	$190.36	$308.58	$109.91	$178.16
553	All ambulatory	Assess, Psychosocial	$195.55	$277.84	$71.42	$101.47
554	All ambulatory	Assess, Physical Therapy	$129.29	$210.00	$50.51	$82.05

Class	Episode Type	Description	Final Cost per Episode excluding medical	Final Cost per Episode including medical	Final Cost per Day excluding medical	Final Cost per Day including medical
555	Same Day & Community	Assess, Multidisciplinary	$426.47	$517.22	$120.21	$145.79
556	Outpatient	Assess, Multidisciplinary	$254.80	$344.30	$92.21	$124.60
557	All ambulatory	Maintenance & Support, Nursing, age>=37, RUG>=5	$748.10	$831.20	$57.02	$63.36
558	All ambulatory	Maintenance & Support, Nursing, age>=37, RUG 4	$776.30	$776.30	$57.39	$57.39
559	All ambulatory	Maintenance & Support, Nursing, age<=36, RUG>=5	$777.36	$777.36	$51.34	$51.34
560	All ambulatory	Maintenance & Support, Nursing, age<=36, RUG 4	$223.44	$223.44	$39.67	$39.67
561	All ambulatory	Maintenance & Support, Physical Therapy, RUG>=6	$406.21	$406.21	$60.44	$60.44
562	All ambulatory	Maintenance & Support, Physical Therapy, RUG 4,5	$339.76	$448.50	$52.17	$68.87
563	Community	Maintenance & Support, Multidisc., age>=27, RUG 4-11	$1,042.13	$1,238.30	$56.90	$67.61
564	All ambulatory	Maintenance & Support, Multidisc., age>=27, RUG>=12	$1,531.57	$1,688.73	$71.27	$78.59
565	Outpatient	Maintenance & Support, Multidisc., age>=27, RUG 4-11	$623.93	$863.99	$81.11	$112.32
566	All ambulatory	Maintenance & Support, Multidisc., <=26 yrs	$667.36	$877.20	$74.26	$97.61

Appendix 15 Resolution of the National SNAP Steering Committee

The National Steering Committee (see Appendix 1) held its final meeting on 8 August 1997 and:

1. Resolved to receive the draft final report and to sign off on the National Project, noting:

   1.1 that the Project has been conducted and finalised in a professional manner;

   1.2 that the Project Team will product a final report for wide distribution; and

   1.3 that the findings and interpretation in the final report remain those of the Project Team.

2. Recommended that the SNAP classification be adopted as the first version of the national classification, noting:

   2.1 that matters of timing, policy, method and scope of implementation rest with respective jurisdictions (States and Territories, private sector and Commonwealth);

   2.2 that matters of:

      i. the interface/boundary between AN-SNAP and other classifications
      ii. boundaries between AN-SNAP case types; and
      iii. AN-SNAP use and refinement

      will require additional work over time.

   In making this recommendation, the Committee noted that the representatives of the Victorian Department of Human Services were unable to support this recommendation without further consultation.

3. Resolved that the Committee record its thanks to the Project Team for their committed and dedicated work in undertaking the Project.