



IHPA

The draft Australian Mental Health Care Classification Version 1.0

Public consultation paper 2 - Supplement

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**The draft Australian Mental Health Care Classification Version 1.0:
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Glossary

AMHCC	Australian Mental Health Care Classification
CV	Coefficient of Variation
HoNOS	Health of the Nation Outcome Scale
HoNOS 65+	Health of the Nation Outcome Scale 65+
HoNOSCA	Health of the Nation Outcome Scale Child and Adolescent
IHPA	Independent Hospital Pricing Authority
LSP-16	Life Skills Profile (Abbreviated)
MHCS	Mental Health Costing Study
MHLS	Mental Health Legal Status
RIV	Reduction in Variance

1. Purpose and Scope

The purpose of this document is to provide information about the statistical modelling approaches and performance analysis associated with the development of the Australian Mental Health Care Classification (AMHCC).

This paper should be read in conjunction with the AMHCC public consultation paper 2. The public consultation seeks stakeholders' views on the proposed AMHCC, and this document provides further detail on its development and specifications.

2. Preparation of the mental health costing study data set

The development of the AMHCC drew on the IHPA mental health costing study (MHCS) as the main empirical data source. The study collected activity and cost data over a six month period from 1 July 2014 to 31 December 2014.

The MHCS generated costed activity data related to 30,645 individual consumers and 58,219 episodes of care.

Table 1: Summary of MHCS data set per setting

Setting	Episodes
Admitted	12,370
Community	45,826
Residential	203
Total	58,219

Analysis has shown that the MHCS data is broadly representative of the population with the exception of the residential setting.

In preparation for use, the MHCS data underwent quality assurance processes that excluded anomalous records and outliers and ensured linkage between the various cost and activity data sources. Records with missing information were excluded when that information was critical to analysis.

Mental health phases of care¹ that commenced prior to the collection period were excluded from the final data set. Table 2 summarises the resulting MHCS data used for classification development. The episodes summarised in Table 2 are those containing at least one phase of care.

Table 2: Summary of final MHCS data set used for classification development

Setting	Consumers	Episodes	Phases
Admitted	6,001	8,356	12,968
Community	11,776	12,578	25,521
Total	17,777	20,934	38,489

¹ The five mental health phases of care are: assessment only, acute, functional gain, intensive extended and consolidating gain.

3. Analysing the performance of the AMHCC

To analyse the performance of the AMHCC across both episode and phase levels, the MHCS data (Table 2) was further restricted to completely costed episodes and their respective phases. For example, episodes with admission dates prior to the start of the MHCS collection period had incomplete costs and were therefore excluded from this analysis along with the phases contained within them.

Table 3 summarises the MHCS data used for analysis of performance of the AMHCC across both episode and phase levels.

Table 3: Summary of MHCS data used for analysis of performance

Setting	Consumers	Episodes	Phases
Admitted	2,899	4,616	5,667
Community	9,383	9,976	17,178
Total	12,282	14,592	22,845

The performance of the AMHCC can be measured using the reduction in variance (RIV) statistic. RIV is measured by calculating the proportion of episode cost variation explained by taking the mean cost of each of the five phases of care in each setting and rolling these average phase costs up within each episode based on the phase of care composition of the episode.

Table 4 shows the performance of the AMHCC. It shows an increase in RIV from 20.6 per cent to 38.6 per cent in the admitted setting, and an increase from 20.9 per cent to 26.6 per cent in the community setting.

Table 4: Summary of AMHCC Version 1.0 statistical performance (RIV) at the episode level

Setting	Number of episodes	AMHCC V1.0
Admitted	4,616	38.6%
Community	9,976	26.6%

(i) Performance of mental health phase of care

The AMHCC uses a number of variables; however, mental health phase of care is a new concept and a key splitting variable in the AMHCC and so is discussed in more detail below.

The implementation of the mental health phase of care has the effect of reducing the range of costs within each of the end classes. Table 5 compares the variation in cost at episode and phase levels in the admitted setting, and Table 6 compares episode and phase costs in the community setting. There is a reduction in the distribution of costs in both settings, with the interquartile range of admitted costs reducing 25.6 per cent from \$9,457 to \$7,032, and the interquartile range of community costs reducing 41.7 per cent from \$1,947 to \$1,134.

Table 5: Summary of episode and phase of care costs in the admitted setting²

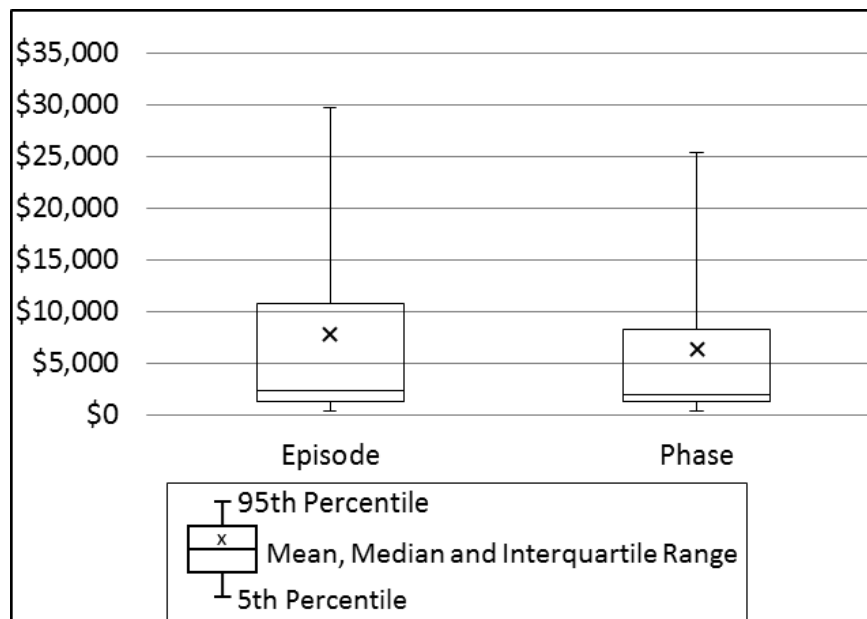
Level	N	Mean	Std. Dev.	Percentiles				
				5th	25th	50th	75th	95th
Episode	4,616	\$7,829	\$10,787	\$439	\$1,325	\$2,407	\$10,782	\$29,728
Phase	5,667	\$6,377	\$8,634	\$352	\$1,307	\$2,026	\$8,338	\$25,454

Table 6: Summary of episode and phase of care costs in the community setting²

Level	N	Mean	Std. Dev.	Percentiles				
				5th	25th	50th	75th	95th
Episode	9,976	\$1,791	\$2,163	\$64	\$409	\$1,061	\$2,355	\$5,684
Phase	17,178	\$1,040	\$1,272	\$47	\$205	\$576	\$1,339	\$3,772

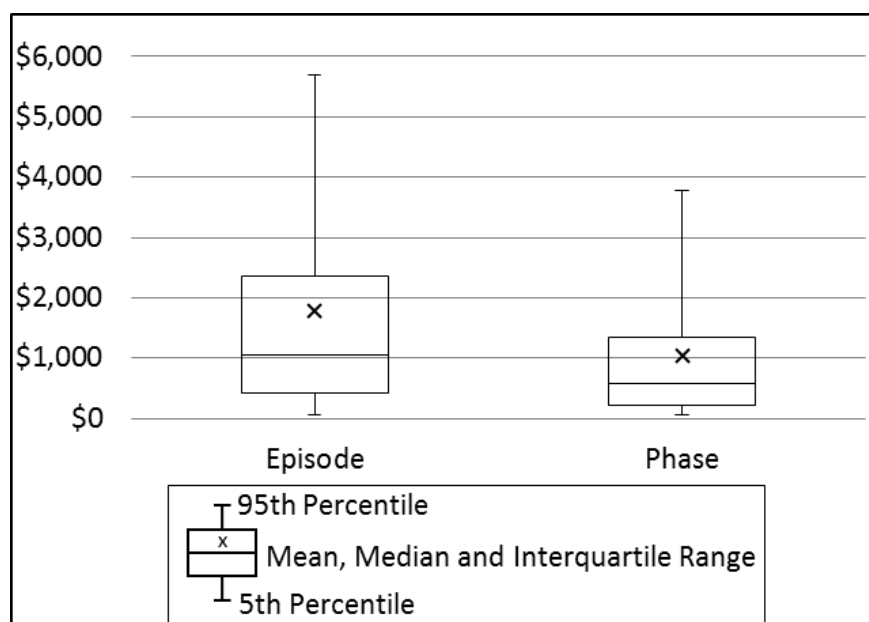
Figure 1 and Figure 2 use box plots to graphically illustrate the reduction in cost distribution shown in Table 5 and Table 6.

Figure 1: Box plot of episode and phase costs in the admitted setting



² All figures are rounded to the nearest dollar

Figure 2: Box plot of episode and phase costs in the community setting



The episode length profile of the MHCS data is short due to the six month collection window. Consequently, extending the use of phase of care to all mental health care type episodes through the implementation of the AMHCC is likely to show more distinct reductions in cost variation from episode to phase of care.

(ii) Measurement of class homogeneity

Coefficient of variation (CV) statistics can also provide insight into relative levels of cost variation within individual end classes of a classification, with lower CVs indicating a narrower relative distribution of costs and consequently higher performance. The CV of cost is defined as the standard deviation of costs divided by the mean cost.

Table 7 summarises the AMHCC end classes by CV range in the admitted setting, and Table 8 summarises end classes by CV range in the community setting.

CV statistics are calculated using sample estimates of the mean cost and standard deviation of costs, and consequently their accuracy is affected by sample size. For this reason, Table 7 and Table 8 are restricted to end classes containing 30 or more phases. Unknown phase of care and unknown HoNOS end classes are also excluded. For that reason, the total number of phases of care is less than that referred to in Table 3.

Each CV estimate has a margin of error resulting from the margins of error around its component standard deviation and mean estimates. Furthermore, the standard deviation statistic can be particularly sensitive to high cost observations. These factors should be kept in mind when interpreting Table 7 and Table 8.

Table 7: Summary of AMHCC Version 1.0 admitted setting end classes by CV range

CV Range	End classes	Phases of care	
		N	%
<0.7	0	0	0%
0.7 - 0.8	2	445	8%
0.8 - 0.9	2	239	4%
0.9 - 1.0	2	1,421	25%
1.0 - 1.1	6	2,426	42%
1.1 - 1.2	1	450	8%
1.2 - 1.3	1	56	1%
1.3 - 1.4	1	190	3%
>1.4	2	489	9%
Total	17	5,716	100%

Table 8: Summary of AMHCC Version 1.0 community setting end classes by CV range

CV Range	End classes	Phases of care	
		N	%
< 0.9	0	0	0%
0.9 - 1.0	5	393	7%
1.0 - 1.1	7	2,446	43%
1.1 - 1.2	9	2,124	37%
1.2 - 1.3	2	776	14%
> 1.3	0	0	0.0%
Total	23	5,739	100%

These CVs are expected to improve over time with refinements in the collection of mental health phase of care and alignment of HoNOS and LSP-16 collections within phases.

4. End class specifications

The AMHCC end class specifications were derived from analysing trends and profiles across all MHCS data, and are not based solely on best performing cost statistics. Attachment A contains statistics by end class, including mean cost estimates and their 95 per cent confidence intervals, sample size counts and CV estimates.

It is noted that four pairs of end classes where the mean cost estimate for the 'moderate complexity' end class is greater than that of the 'high complexity' end class.

In three of the four pairs of end classes (211A – 211B, 213A – 213B, and 243A – 243B), comparisons include mean cost estimates based on samples of fewer than 30 records. These estimates are too small to yield reliable results and should not be used to draw conclusions regarding end class hierarchies.

The remaining comparison (113A – 113B) uses mean cost estimates based on 92 or more records. Although this sample size is large enough to use for statistical purposes, it is relatively small and is therefore particularly susceptible to outlier observations.

The accuracy of end class mean cost estimates is influenced by sample size, cost variation and sample variation in the MHCS data, and is expected to improve over time with refinements in the collection of mental health phase of care.

5. More information

The [IHPA website](#) provides up to date information on the development of the AMHCC. The link for *Development of the AMHCC: public consultation paper 2* is https://consultation.ihpa.gov.au/mental-health-care/amhcc/consult_view.

By its nature, this is a technical document which assumes some knowledge of classification development. This document should be read in conjunction with the AMHCC public consultation paper 2. IHPA recognises the importance of a broader audience engaging in this consultation process. Should your organisation require further resources to assist in explaining the classification development process, please contact IHPA at enquiries.ihpa@ihpa.gov.au

Attachment A: AMHCC end class statistics

Setting	AMHCC V1 Code	AMHCC V1 Description	Records		Cost				Days Lapsed		Service Contact Days		Service Contacts	
			Total	Modelling	Mean	Mean - 95% CI LB	Mean - 95% CI UB	CV	Mean	StD	Mean	StD	Mean	StD
Admitted	101Z	Admitted, Assessment Only, 0-17 years	112	56	\$3,576	\$2,656	\$4,813	1.22	1.5	1.5				
Admitted	102Z	Admitted, Assessment Only, 18-64 years	694	308	\$3,599	\$3,171	\$4,086	1.1	1.9	2.3				
Admitted	103Z	Admitted, Assessment Only, 65+ years	242	39	\$8,953	\$6,270	\$12,784	0.87	3.5	3.2				
Admitted	111A	Admitted, Acute, 0-17 years, High HoNOS Complexity	70	39	\$11,460	\$8,026	\$16,363	1.04	13.5	14.8				
Admitted	111B	Admitted, Acute, 0-17 years, Moderate HoNOS Complexity	138	54	\$11,079	\$8,185	\$14,995	1.01	12.1	13.2				
Admitted	111Z	Admitted, Acute, 0-17 years, Unknown HoNOS	456	297	\$9,074	\$7,976	\$10,324	1.55	5.6	9.3				
Admitted	1121A	Admitted, Acute, 18-64 years, Involuntary, High HoNOS Complexity	594	353	\$20,288	\$18,022	\$22,837	0.77	11.8	9.4				
Admitted	1121B	Admitted, Acute, 18-64 years, Involuntary, Moderate HoNOS Complexity	1065	496	\$18,508	\$16,749	\$20,452	0.92	9.9	9.3				
Admitted	1121Z	Admitted, Acute, 18-64 years, Involuntary, Unknown HoNOS	2105	1334	\$16,242	\$15,283	\$17,262	1.05	11.9	12.1				
Admitted	1122A	Admitted, Acute, 18-64 years, Voluntary, High HoNOS Complexity	1122	925	\$12,511	\$11,629	\$13,461	0.94	14.5	11.7				
Admitted	1122B	Admitted, Acute, 18-64 years, Voluntary, Moderate HoNOS Complexity	2460	1727	\$10,162	\$9,633	\$10,721	1.05	12.5	11.5				
Admitted	1122Z	Admitted, Acute, 18-64 years, Voluntary, Unknown HoNOS	1641	1089	\$7,604	\$7,108	\$8,134	1.49	6.9	10				
Admitted	113A	Admitted, Acute, 65+ years, High HoNOS Complexity	181	92	\$10,716	\$8,498	\$13,513	0.77	15.7	10.8				
Admitted	113B	Admitted, Acute, 65+ years, Moderate HoNOS Complexity	370	200	\$11,634	\$9,941	\$13,616	0.84	13.7	11.2				
Admitted	113Z	Admitted, Acute, 65+ years, Unknown HoNOS	2251	1865	\$3,120	\$2,963	\$3,285	1.91	2.9	6.5				
Admitted	121A	Admitted, Functional Gain, 0-17 years, High HoNOS Complexity	8	6	\$7,314	\$2,950	\$18,135	1.31	1.3	0.5				
Admitted	121B	Admitted, Functional Gain, 0-17 years, Moderate HoNOS Complexity	12	2	\$1,390	\$288	\$6,699	0.87	1	0				
Admitted	121Z	Admitted, Functional Gain, 0-17 years, Unknown HoNOS	76	37	\$3,412	\$2,367	\$4,918	0.99	2.1	3.7				
Admitted	122A	Admitted, Functional Gain, 18-64 years, High HoNOS Complexity	347	210	\$9,816	\$8,419	\$11,444	1.08	6.6	7.4				
Admitted	122B	Admitted, Functional Gain, 18-64 years, Moderate HoNOS Complexity	736	450	\$6,674	\$6,010	\$7,412	1.18	4.8	6.8				
Admitted	122Z	Admitted, Functional Gain, 18-64 years, Unknown HoNOS	1828	972	\$10,638	\$9,906	\$11,425	1.16	8.8	8.4				
Admitted	123A	Admitted, Functional Gain, 65+ years, High HoNOS Complexity	36	13	\$9,595	\$5,177	\$17,781	1.21	3.9	4.9				
Admitted	123B	Admitted, Functional Gain, 65+ years, Moderate HoNOS Complexity	58	22	\$5,927	\$3,689	\$9,523	1.36	2.9	5.1				
Admitted	123Z	Admitted, Functional Gain, 65+ years, Unknown HoNOS	193	83	\$6,519	\$5,107	\$8,321	1.66	2.9	4.5				
Admitted	131A	Admitted, intensive Extended, 0-17 years, High HoNOS Complexity	8	7	\$4,788	\$2,066	\$11,099	1.1	5	5.5				
Admitted	131B	Admitted, intensive Extended, 0-17 years, Moderate HoNOS Complexity	4	4	\$1,469	\$483	\$4,466	0.47	1	0				
Admitted	131Z	Admitted, intensive Extended, 0-17 years, Unknown HoNOS	151	137	\$5,381	\$4,449	\$6,507	1.3	8.5	16.2				
Admitted	132A	Admitted, intensive Extended, 18-64 years, High HoNOS Complexity	122	88	\$12,717	\$10,032	\$16,120	1.09	8.2	9				
Admitted	132B	Admitted, intensive Extended, 18-64 years, Moderate HoNOS Complexity	266	190	\$5,882	\$5,006	\$6,912	1.4	4.3	7.7				
Admitted	132Z	Admitted, intensive Extended, 18-64 years, Unknown HoNOS	1109	730	\$9,988	\$9,199	\$10,845	1.2	7.2	7.7				
Admitted	133A	Admitted, intensive Extended, 65+ years, High HoNOS Complexity	15	8	\$21,467	\$9,778	\$47,131	1.03	12.6	12				
Admitted	133B	Admitted, intensive Extended, 65+ years, Moderate HoNOS Complexity	12	10	\$13,252	\$6,559	\$26,777	1.05	7.3	7.3				
Admitted	133Z	Admitted, intensive Extended, 65+ years, Unknown HoNOS	177	115	\$6,410	\$5,209	\$7,887	1.63	4.1	7.4				
Admitted	141A	Admitted, Consolidating Gain, 0-17 years, High HoNOS Complexity	5	2	\$5,473	\$1,136	\$26,384	0.9	1.5	0.7				
Admitted	141B	Admitted, Consolidating Gain, 0-17 years, Moderate HoNOS Complexity	17	0										
Admitted	141Z	Admitted, Consolidating Gain, 0-17 years, Unknown HoNOS	37	22	\$5,026	\$3,128	\$8,075	0.77	1.7	0.9				
Admitted	142A	Admitted, Consolidating Gain, 18-64 years, High HoNOS Complexity	413	166	\$4,865	\$4,094	\$5,782	1.57	3.5	4.6				
Admitted	142B	Admitted, Consolidating Gain, 18-64 years, Moderate HoNOS Complexity	867	323	\$2,916	\$2,576	\$3,300	1.61	2.2	3.6				
Admitted	142Z	Admitted, Consolidating Gain, 18-64 years, Unknown HoNOS	720	416	\$9,035	\$8,101	\$10,076	1.22	7.1	8.3				
Admitted	143A	Admitted, Consolidating Gain, 65+ years, High HoNOS Complexity	39	14	\$8,905	\$4,914	\$16,136	1.26	7.6	11.2				
Admitted	143B	Admitted, Consolidating Gain, 65+ years, Moderate HoNOS Complexity	84	8	\$5,552	\$2,529	\$12,190	0.98	2.8	4.6				
Admitted	143Z	Admitted, Consolidating Gain, 65+ years, Unknown HoNOS	126	59	\$6,127	\$4,587	\$8,185	1.39	5.4	6.9				
Admitted	191Z	Admitted, Unknown Phase, 0-17 years	327	0										
Admitted	192Z	Admitted, Unknown Phase, 18-64 years	3881	0										
Admitted	193Z	Admitted, Unknown Phase, 65+ years	647	0										
Community	201Z	Community, Assessment Only, 0-17 years	1887	439	\$804	\$723	\$894	1.09	9.7	8.5	2.1	1.5	4.1	4
Community	202Z	Community, Assessment Only, 18-64 years	4814	887	\$778	\$722	\$838	1.03	8	7.9	2.6	2	4.6	4.2
Community	203Z	Community, Assessment Only, 65+ years	430	71	\$829	\$637	\$1,079	0.96	6.9	8.4	1.8	1.2	2.9	2.8
Community	211A	Community, Acute, 0-17 years, High HoNOS Complexity	26	7	\$1,430	\$617	\$3,315	0.75	33.9	62.1	3.7	2.6	12.4	12.1
Community	211B	Community, Acute, 0-17 years, Moderate HoNOS Complexity	197	85	\$1,502	\$1,180	\$1,911	1.04	22.2	25	3.3	3.6	7.7	11.7
Community	211Z	Community, Acute, 0-17 years, Unknown HoNOS	1356	466	\$1,220	\$1,101	\$1,353	1.22	18.9	25.8	2.9	4	6.4	8.8
Community	212A	Community, Acute, 18-64 years, High HoNOS Complexity	227	94	\$2,438	\$1,939	\$3,067	0.96	20.1	24.9	5.9	5.9	14.4	15.4
Community	212B1	Community, Acute, 18-64 years, Moderate HoNOS Complexity with High LSP Complexity	152	105	\$2,216	\$1,783	\$2,753	1.08	37.6	39.6	7.8	8	16.2	17.9
Community	212B2	Community, Acute, 18-64 years, Moderate HoNOS Complexity with Moderate LSP Complexity	1694	798	\$1,825	\$1,686	\$1,974	1.05	34.1	40.9	6.4	6.7	12.2	14.8
Community	212Z	Community, Acute, 18-64 years, Unknown HoNOS	9116	4272	\$1,175	\$1,135	\$1,215	1.27	25.6	37.7	4.5	5.4	8.1	11

