Australian Mental Health Outcomes and Classification Network

'Sharing Information to Improve Outcomes'

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Analysis of 'zero' ratings with the HoNOS suite of NOCC measures

Version 1.0

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BACKGROUND

At the April 2010 meeting of the National Mental Health Information Development Expert Advisory Panel (NMHIDEAP), AMHOCN presented data quality reports which described, for each point in the collection protocol:

1. the overall volume of information reported; and

2. the 'completeness' of that material for the purposes of analysis and reporting.

This analysis has stimulated much discussion in Expert Panels and other fora about the quality of the data submitted as part of the National Outcomes and Casemix Collection.

To assist AMHOCN and the jurisdictions in their analysis and reporting of the data and to provide information that might feed into future training resources, it has been suggested that focus should now be given to describing structurally valid but implausible ratings for various outcome measures at different service settings and collection occasions.

Ratings of items can be described in terms of three mutually exclusive categories:

1. valid 'clinical' ratings that typically indicate levels of problem severity;

2. valid 'non-clinical' ratings that typically indicate reasons why problem severity was not rated; and

3. invalid values such as 'nulls' or values outside of the range for 1 and 2 above.

The validity of a measure is derived from consideration of the validity of the items that comprises that measure. Valid scores can be estimated either when all of the items are clinically valid OR when a sufficient number of items are clinically valid.

The following table shows the criteria used to determine whether a NOCC measure had been validly completed for the purposes of subsequent statistical reporting:

Table 1: Completion criteria for each of the NOCC measures		
NOCC Measure	**Age Group**	**Completion Criteria**
HoNOSCA	C&A	At least 11 of the first 13 HoNOSCA items have Valid Clinical Ratings
CGAS	C&A	Any Valid Clinical Rating
FIHS	C&A	At least 6 of the 7 FIHS items have Valid Clinical Ratings
SDQ – all Versions	C&A	At least 20 of the first 25 items have Valid Clinical Ratings
Age	C&A	Aged at least 1 day to less than 25 years inclusive
HoNOS / 65+	A&OP	At least 10 items have Valid Clinical Ratings
LSP-16	A&OP	At least 14 items have Valid Clinical Ratings
FoC	A&OP	Any Valid Clinical Rating
BASIS-32	A&OP	At least 27 items have Valid Clinical Ratings***
K10+	A&OP	At least 9 items have Valid Clinical Ratings

MHI-38	A&OP	At least 30 items have Valid Clinical Ratings
Age	A	Aged between 15 and 110 years inclusive
RUG-ADL	OP	All 4 items have Valid Clinical Ratings
Age	OP	Aged between 55 and 110 years inclusive
Principal Diagnosis	All	Any Valid Mental Health Diagnosis Summary Group
MHLS	All	Either Voluntary or Involuntary Status recorded
Sex	All	Either Male or Female Sex recorded

Explanatory Notes:

***	BASIS-32 items 2, 3 & 4 only count as one item
C&A	Child & Adolescent Collection Age Group
A&OP	Adult AND Older Person Collection Age Group
A	Adult Collection Age Group
OP	Older Person Collection Age Group

In AMHOCN's analysis of data, only the valid clinical ratings of the items comprising a measures subscale or total scores have been considered. If a component item was 'missing', it was treated as contributing '0' to the overall score'. If all of the items comprising a subscale were 'missing', then the overall score was set to missing with no valid observations.

This method is not perfect since it results in 'averages' that are biased downwards: the fewer items that are completed, the less opportunity exists to achieve a high score. For example, the maximum of a HoNOS with only 10 completed items is 40. While the reporting of statistics could have been restricted to instances where there were no missing data, that method would have introduced other biases – specifically, the means and standard deviations only apply to populations where there are no missing data and the statistics will be based on a smaller set of observations. There is no single 'best' solution. The approach adopted (i.e., setting both a high threshold for a measure to be considered valid and 'missing ratings' to 0) is transparent, can be replicated readily and reflects many clinical situations.

ANALYSIS OF ZERO RATINGS WITH THE HONOS SUITE OF NOCC MEASURES

To inform discussion of these issues, AMHOCN has undertaken some preliminary analyses with the three measures that comprise the HoNOS suite of measures (i.e., the HoNOSCA, the HoNOS and the HoNOS65+). For ease of reference, these measures are collectively referred to as the HoNOS for the remainder of this paper. The approach taken here could also be applied to the other measures that form the National Outcomes and Casemix Collection.

The objectives of these analyses were to explore the extent to which HoNOS clinical ratings might be considered implausible and to examine whether implausible ratings are related to specific:

        a. jurisdictions;
        b. mental health service organisations;
        c. age groups;
        d. mental health service settings;
        e. episode type (sequence or singleton); and/or
        f. collection occasions (i.e., admission, review, discharge).

ANALYSIS STRATEGY

It is highly unlikely that all 12 HoNOS or HoNOS65+ scales, or all 15 HoNOSCA scales, would be rated as '0' indicating '*No problem within the period rated*'. These profiles warrant further investigation. It is noted, however, that '0' ratings are more likely to occur validly at discharge from care but highly unlikely to occur at admission to care.

Analyses are limited to 2008-2009 data that meet AMHOCN's 'gold standard'. GOLD is defined as those NOCC data where there are no sequencing errors within the set of collection occasions and/or no conflicting age-sex person details; in 2008-2009, 84.3% of all data submitted in 2008-2009 are considered GOLD.

NOCC data for Community Residential Services represents less than 2% of all collection occasions reported and are not examined in this paper.

Only those HoNOS ratings that met 'valid completion' criteria were considered. These represent 86.8% of all collection occasions where the measure was required per the national protocol; 98.2% of ratings met the 'completion criteria' described in Table 1.

ZERO RATINGS BY JURISDICTION

Zero ratings could be related to specific practices within Jurisdictions or could be indicative of issues with local or statewide information systems within jurisdictions or organisations. The following table shows the distribution of zero ratings for each jurisdiction, partitioned by age group.

It can be seen that from a national aggregate perspective the proportion of zero ratings across age groups is relatively low (3.0%) although the rates for Adult services

(3.5%) are almost twice those for Older Persons services (1.9%) and more than 2.5 times that of Child & Adolescent services (1.4%).

It is also clear that the proportion of zero ratings varies across jurisdictions. Jurisdiction 'F' has no HoNOS ratings where all of the scales are rated zero whereas Jurisdiction 'A' has 6.1% of its HoNOS ratings comprise all zeros.

Table 2: Distribution of zero ratings by Jurisdiction and Age Group.

State	Child & Adolescent % 0	Adult % 0	Older Persons % 0	Total % 0
A	3.4	7.0	3.7	6.1
B	0.3	2.2	1.4	1.9
C	1.1	2.9	1.5	2.4
D	0.4	2.8	1.7	2.3
E	1.7	1.1	0.5	1.3
F	0.0	0.0	0.0	0.0
G	0.0	1.3	3.7	1.5
H	0.0	4.6	3.4	4.2
AUS	1.4	3.5	1.9	3.0

ZERO RATINGS BY AGE GROUP, MENTAL HEALTH SERVICE SETTING & COLLECTION OCCASION

Tables 3.1, 3.2 & 3.3 show the proportion of zero ratings stratified by mental health service setting, collection occasion and episode type, the latter reflecting whether ratings are reported as part of valid sequences of collections or single ratings not part of a sequence, for each of the three age groups respectively.

Table 3.1: Zero clinical ratings by mental health service setting, collection occasion and episode type: Child & Adolescents

Setting	Collection Occasion	Episode Type	Total Ratings	% All '0'	% Not All '0'
Inpatient	Admission	Sequence	1824	0.2	99.8
		Singleton	508	0.2	99.8
	Review	Sequence	109	0	100
		Singleton	34	0	100
	Discharge	Sequence	1505	1.5	98.5
		Singleton	260	0.8	99.2
Ambulatory	Admission	Sequence	7859	0.4	99.6
		Singleton	7778	0.1	99.9
	Review	Sequence	13225	0.5	99.5
		Singleton	1206	1.2	98.8
	Discharge	Sequence	5478	4.2	95.8
		Singleton	3183	7.5	92.5

For Child & Adolescent services, zero ratings are more frequent at Discharge from Ambulatory Care, especially so for singleton collection occasions.

Table 3.2: Zero clinical ratings by mental health service setting, collection occasion and episode type: Adults

Setting	Collection Occasion	Episode Type	Total Ratings	% All '0'	% Not All '0'
Inpatient	Admission	Sequence	28136	0.2	99.8
		Singleton	10508	0.3	99.7
	Review	Sequence	4873	2.3	97.7
		Singleton	406	2.5	97.5
	Discharge	Sequence	23214	8.9	91.1
		Singleton	4357	10.4	89.6
Ambulatory	Admission	Sequence	22764	0.9	99.1
		Singleton	18160	1.2	98.8
	Review	Sequence	67890	2.8	97.2
		Singleton	8452	3.3	96.7
	Discharge	Sequence	16299	7.1	92.9
		Singleton	7829	12.3	87.7

For Adult services, zero ratings are more frequent at Discharge regardless of whether the setting is Inpatient or Ambulatory and regardless of whether the rating occurred as a part of a sequence of collection occasions or was a singleton.

Table 3.3: Zero clinical ratings by mental health service setting, collection occasion and episode type: Older Persons

Setting	Collection Occasion	Episode Type	Total Ratings	% All '0'	% Not All '0'
Inpatient	Admission	Sequence	3498	0.3	99.7
		Singleton	975	0.4	99.6
	Review	Sequence	2974	0.5	99.5
		Singleton	78	0.0	100
	Discharge	Sequence	3309	3.7	96.3
		Singleton	620	4.0	96.0
Ambulatory	Admission	Sequence	5964	0.7	99.3
		Singleton	3134	0.5	99.5
	Review	Sequence	12319	2.0	98.0
		Singleton	969	2.6	97.4
	Discharge	Sequence	5088	3.9	96.1
		Singleton	2223	3.9	96.1

For Older Persons services, zero ratings are more frequent at Discharge regardless of whether the setting is Inpatient or Ambulatory and regardless of whether the rating occurred as a part of a sequence of collection occasions or was a singleton.

ZERO RATINGS BY MENTAL HEALTH SERVICE ORGANISATION

A total of 820 'age group – mental health service setting' organisations' reported HoNOS ratings. There was, however, significant variation among these 'organisations' in the overall number of ratings reported. Approximately 22% of 'organisations' (n = 174) reported fewer than 10 HoNOS ratings; approximately 91% of their ratings had no zero ratings.

When 'low' volume organisations are excluded, approximately 29% (n = 184) of these had no zero ratings. The next set of analyses considers only those organisations that reported at least 1 zero rating.

The proportions of zero ratings for these remaining 'organisations' (n = 462) were classified hierarchically into four groups: (i) less than 1%; (ii) less than 2% ; (iii) less than 3%; and (iv) more than 3%. The distribution of zero ratings is presented in the following table. It can be seen that almost 40% of 'organisations', reporting one third of all HoNOS ratings, had at least 3% of these ratings with all zeros.

Table 4: Classification of zero clinical ratings for those organisations with at least 10 HoNOS ratings and at least one HoNOS all zero ratings

Proportion '0'	'Organisations'		HoNOS Ratings	
	N	%	N	%
0.1% - 0.9%	94	20.3	53021	19.5
1.1% - 1.9%	107	23.2	67678	24.9
2.1% - 2.9%	77	16.7	60096	22.1
3.0% +	184	39.8	90609	33.4
Total	**462**	**100.0**	**271404**	**100.0**

The following table summarises the overall proportion of zero ratings within mental health service organisations to explore the idea that zero ratings issues are specific to that organisation, regardless of mental health service setting or collection occasion age group. Note, that not all mental health service organisations have specific age group and/or service specific programs.

Table 5: Distribution of zero clinical ratings across program types within those mental health service organisations with at least 10% of all ratings zero

Org ID	N	% 0	Child & Adolescent		Adult		Older Persons	
			Inp %	Amb %	Inp %	Amb %	Inp %	Amb %
131	1988	23.8	.	1.3	.	42.5	.	5.1
48	517	20.5	.	.	19.2	.	62.5	.
104	2227	20.3	11.8	.	20.5	.	12.5	.
44	613	20.2	1.1	.	23.4	.	.	.
126	271	18.5	.	.	.	18.5	.	.
141	505	14.3	.	.	14.3	.	.	.
139	2083	13.8	.	8.2	.	17.2	.	8.0
96	927	13.3	8.7	.	13.4	.	.	.
70	925	13.1	.	.	13.2	.	10.9	.
43	683	11.3	.	.	.	11.3	.	.
47	104	10.6	.	.	.	10.6	.	.
507	450	10.4	.	.	10.6	.	8.6	.
226	592	10.1	.	.	11.8	.	1.1	.
53	10.0	10.0	.	.	.	10.0	.	.

The following table lists the <u>overall</u> proportion of zero ratings for the five highest ranking organisations mental health service organisations for <u>specific mental health service setting and collection occasion age groups.</u>

Table 6: Five highest ranking organisations, within age group and mental health service setting programs, with all ratings zero

Age Group	Setting	Org ID	Collection Occasion	N	% 0
Child & Adolescent	Inpatient	130	Discharge	17	11.8
		100	Discharge	55	5.5
		143	Admission	28	3.6
		162	Discharge	100	3.0
		4	Discharge	106	2.8
	Ambulatory	133	Discharge	347	35.4
		512	Discharge	15	33.3
		135	Discharge	161	31.1
		97	Discharge	10	30.0
		139	Discharge	93	25.8
Adult	Inpatient	104	Discharge	623	64.4
		44	Discharge	273	45.1
		48	Discharge	216	40.7
		96	Discharge	323	36.2
		70	Discharge	344	31.7
	Ambulatory	131	Discharge	455	89.0
		126	Discharge	48	77.1
		256	Discharge	123	42.3
		139	Discharge	473	42.1
		550	Discharge	273	32.2
Older Persons	Inpatient	42	Discharge	16	31.3
		68	Discharge	10	30.0
		36	Discharge	55	27.3
		70	Discharge	27	22.2
		507	Discharge	16	18.8
	Ambulatory	139	Discharge	144	22.9
		142	Discharge	89	18.0
		523	Review	22	13.6
		249	Discharge	31	12.9
		103	Review	281	12.8

IMPACT OF ZERO RATINGS

The following table profiles descriptive statistics for the 'HoNOS' total score, for each of the three age groups, by setting and collection occasion. This analysis compares HoNOS total scores calculated with ratings that include or exclude total zero ratings.

Table 7: Descriptive statistics for HoNOS total scores comparing all ratings (zero ratings included) vs. zero ratings excluded.

Age Group	Setting	Collection Occasion	N	Mean	SD	N	Mean	SD
				Including all '0'			Excluding all '0'	
	Inp	Adm	2332	17.8	7.1	2328	17.8	7.1
		Rev	143	17.5	8.3	143	17.5	8.3
		Dis	1765	11.4	7.1	1741	11.6	7.0
Child & Adolescent								
	Amb	Adm	15637	14.3	6.7	15593	14.4	6.7
		Rev	14431	12.6	6.6	14357	12.6	6.5
		Dis	8661	9.1	6.9	8191	9.6	6.7
	Inp	Adm	38644	14.2	6.7	38551	14.3	6.7
		Rev	5279	11.4	6.8	5157	11.7	6.7
		Dis	27571	6.5	5.4	25054	7.1	5.2
Adult								
	Amb	Adm	40924	12.0	6.2	40510	12.1	6.1
		Rev	76342	9.3	6.1	74143	9.6	5.9
		Dis	24128	8.2	6.7	22010	8.9	6.5
	Inp	Adm	4473	15.7	7.0	4460	15.7	7.0
		Rev	3052	12.3	6.6	3037	12.3	6.5
		Dis	3929	9.1	6.6	3782	9.5	6.5
Older Persons								
	Amb	Adm	9098	12.5	6.3	9043	12.6	6.2
		Rev	13288	9.5	6.0	13013	9.7	5.9
		Dis	7311	9.4	6.4	7028	9.7	6.2

Finally, table 8 presents effect size estimates for completed episodes by age group and mental health service setting and shows the impact of including or excluding all zero ratings. Excluding all zero ratings generally reduces overall effect sizes, especially for ambulatory services and most noticeably for Adult services.

Table 8: Effect size estimates for completed episodes comparing all ratings vs. zero ratings excluded.

Age Group	Setting	Effect Size	
		Including all '0'	Excluding all '0'
Child & Adolescent	Inpatient	0.90	0.89
	Ambulatory	0.79	0.72
Adult	Inpatient	1.16	1.07
	Ambulatory	0.61	0.51
Older Persons	Inpatient	0.93	0.89
	Ambulatory	0.50	0.46