2 September 2008

Testing the distribution of first 33,000 ACFI appraisals

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EXECUTIVE SUMMARY

The use of the new Aged Care Funding Instrument (ACFI) commenced on 20 March 2008. From that date, new residents of residential aged care are being appraised and classified using the ACFI. Existing residents are being reappraised using the new instrument as their existing RCS classifications expire.

Three components of the residential care subsidy are determined by the ACFI: activities of daily living (ADL), behaviour (BEH) and complex health care (CHC). Under the ACFI, residents are given a score which rates their care needs for each of these components.

Approximately 33,000 applications for classification are now available. The Department has asked Access Economics to perform a statistical analysis to determine whether actual proportions of residents in each ACFI category are either consistent with, or vary from, the previous estimates.

The report describes the investigation of those appraisals.

Reappraisals and new appraisals

The following figures show the distributions of appraisals from reappraisals and new entrants in the ADL and Complex Health Care domains. The reappraisals have higher levels of need in the ADL domain, but similar levels for the Complex Health Care domains. The former is not surprising because the re-appraisals include elements of increased dependency from their RCS categories, which are up to one year old. The similarity in the latter is therefore more surprising.

The results for the Behavioural domain are in between the other two.

DISTRIBUTION OF ACFI APPRAISALS - ADL

DISTRIBUTION OF ACFI APPRAISALS – COMPLEX HEALTH CARE

Comparison of post 20 March appraisals with the ACFI National Trial

The following figure shows the distributions of appraisals in the ADL domain from:

❑ The post 20 March 2008 ACFI appraisals – reappraisals (first column in each set), new entrants (second column) and all appraisals (third column) – and,

❑ The ACFI National Trial (fourth column).

Of most interest is the comparison of the post 20 March 2008 reappraisals with those from the National Trial. The recent reappraisals have more classifications in the High level than the National Trial. That conclusion is also evident in the Behavioural domain

ADL DISTRIBUTION, APPRAISALS AND FROM NATIONAL TRIAL
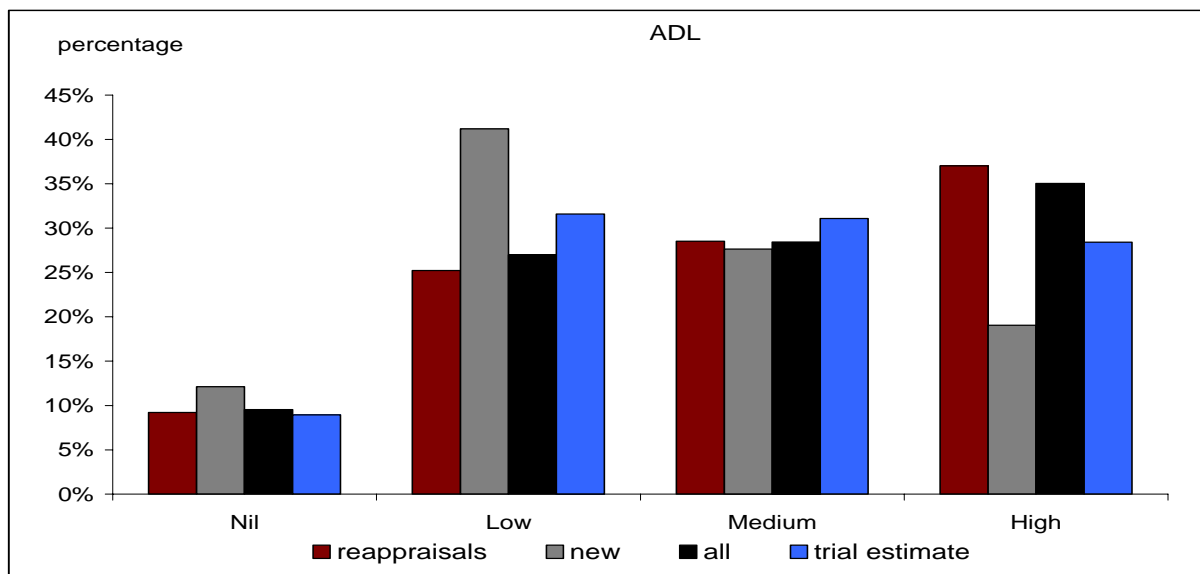
The next figure shows the results for the Complex Health Care domain. There are fewer classifications in the Nil and High levels than from the ACFI National Trial data.

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CHC DISTRIBUTION, APPRAISALS AND FROM NATIONAL TRIAL
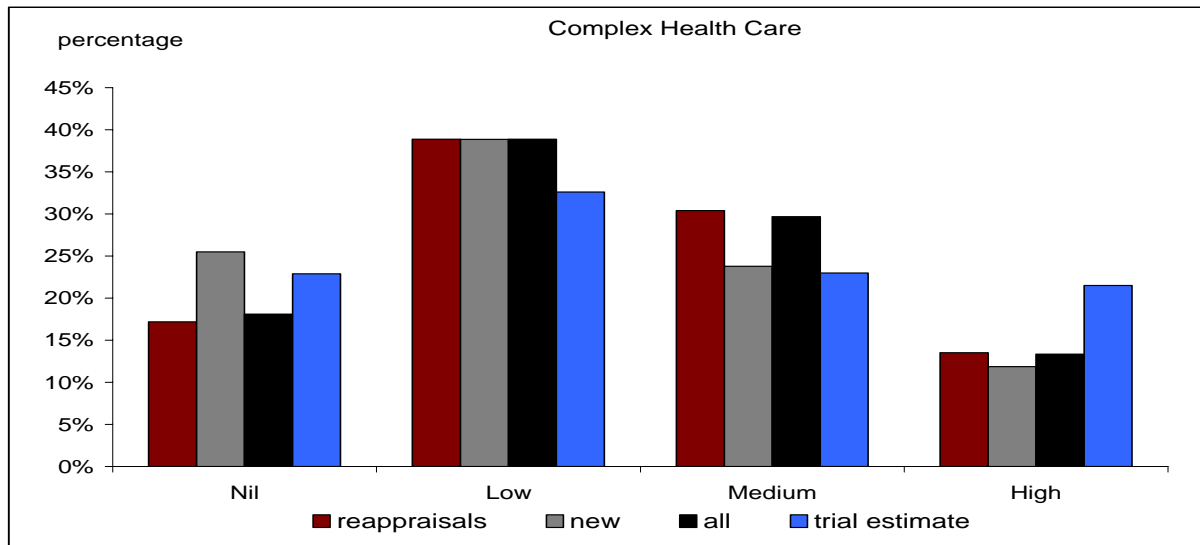
Testing the differences in the proportions

The impression from the figures is that the actual proportions of residents in each ACFI category vary from the estimates provided in the modelling based on the ACFI National Trial data. For example, there are more than expected at the top of the ADL and Behavioural domains and fewer than expected at the top of the Complex Health Care domain.

We apply the statistical tests recommended in the Access Economics report prepared for the Department, *Testing the distribution of ACFI appraisals* (February 2008).

> **The conclusion from the tests is that the actual proportions of residents in each ACFI category are not equal to the previous estimates based on the ACFI National Trial data.**

Tests of the differences between the reappraisals and the ACFI National Trial at individuals levels, such as the difference between the proportions at ADL level 0 (or 1 or 2 or 3, or in the Behavioural and Complex health care domains), confirm that conclusion.

Two possible reasons for the differences are:

1   The characteristics of the residents under appraisal are different in some way from those in the ACFI National Trial.

2   The characteristics of the residents are the same, but the mapping from RCS to ACFI – the way in which residents under RCS are being appraised under ACFI – is different from that in the ACFI National Trial. In other words, for a person with a given RCS level, the current ACFI appraisals are resulting in different ACFI scores than would have resulted using the approach in the ACFI National Trial.

Increased dependency means that the observed RCS levels of the residents being reappraised under ACFI are up to one year old and are higher RCS levels would probably be seen if new RCS appraisals were done now. But that means that, if the RCS to ACFI mapping is consistent with the mapping in the ACFI National Trial, then the higher RCS levels would flow into higher ACFI levels, especially at the tops of the ACFI domains. The ADL and Behavioural domains are consistent with that hypothesis, but it does not hold for the Complex Health Care domain.

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Average subsidy levels

Access Economics has looked at the implications for subsidy payments. The following table shows the average daily subsidy rates for new entrants and reappraisals post 20 March 2008 and based on the distribution of residents in the ACFI National Trial (ignoring grandparenting and the cap on ACFI subsidy rates).

			ESTIMATED SUBSIDY RATES ($)			
Population	**ADL**	**Behavioural**	**CHC**	**ACFI total**	**RCS**	**RCS + 50% AIP**
New entrants	45.38	13.12	19.97	78.48		
Reappraisals	56.87	15.46	23.28	95.61	86.86	92.90
ACFI Trial	52.84	12.41	23.98	89.23	88.84	

Two comparisons of subsidy rates are as expected:

❑ The average ACFI subsidy rate for new entrants is significantly less than that for reappraisals ($78.48 versus $95.61).

❑ The average subsidy levels under ACFI and RCS are similar in the ACFI National Trial ($89.23 versus $88.84). That is expected given that the ACFI rates were determined using the ACFI National Trial data.

A third comparison suggests that the RCS levels of those reappraised are not that different from those in the ACFI National Trial:

❑ The average subsidy levels using the RCS distributions are similar for reappraisals and residents in the ACFI National Trial ($86.86 versus $88.84).

More importantly:

❑ The average ACFI subsidy rate for reappraisals is significantly above that for the residents in the ACFI National Trial ($95.61 versus $89.23). The higher than expected number of appraisals at the top of the ADL (and Behavioural) domain(s) outweighs the opposite effect in the Complex Health Care domain.

❑ The average subsidy payment for reappraisals is significantly higher under ACFI subsidy rates than under the RCS rates, based on their last RCS level ($95.61 versus $86.86).

There are two parts to the last point: increased dependency and 'unexpectedly' higher ACFI appraisals. To split the two, we estimate what the average RCS subsidy rate would have been under an assumption about the increased dependency of the residents. We assume that 50% of residents at RCS levels 2 to 8 move up one RCS level over the year. The average RCS subsidy level would be $92.90 – above that in the ACFI National Trial ($88.84), but still less than the average subsidy level under ACFI ($95.61).

Finally, whether the current analysis should be repeated as more ACFI appraisals become available (over the next year, say) would depend on the aims of any further analysis, the extent to which the increased dependency versus 'unexpectedly' higher ACFI appraisals can be unravelled using historical data on RCS appraisals, and the relative weight given to higher than expected versus lower than expected subsidies.

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1. INTRODUCTION

The use of the new Aged Care Funding Instrument (ACFI) commenced on 20 March 2008. Since that date, new residents of residential aged care are being appraised and classified using the ACFI. Existing residents are being reappraised using the new instrument as their existing RCS classifications expire.

Three components of the residential care subsidy are determined by the ACFI: activities of daily living (ADL), behaviour (BEH) and complex health care (CHC). Under the ACFI, residents are given a score which rates their care needs for each of these components.

Access Economics has previously undertaken a review of the ACFI[1] and an assessment of the number of ACFI applications for classification (appraisals) that would be required for the Department to be confident level, that the actual proportions of residents in each ACFI category are either consistent with or vary from the estimates provided in the previous modelling.[2] In the latter, Access Economics determined that the Department would need over 20,000 applications for classification to be 99% confident that the appropriate statistical test identifies a difference of 0.01 (one percentage point) between the actual proportions and the proportions in the previous modelling.

Approximately 33,000 applications for classification are now available. The Department has asked Access Economics to perform a statistical analysis to determine whether actual proportions of residents in each ACFI category are either consistent with, or vary from, the previous estimates. This report describes the results of an analysis of the data.

The plan of the report is as follows:

❑ Section 2 describes the data used in the report.

❑ Section 3 describes the distributions of ACFI appraisals post 20 March 2008 and tests the basic hypotheses that the actual proportions of residents in each ACFI category are either consistent with or vary from the estimates provided in the modelling of the ACFI National Trial data.

❑ Section 4 discusses two possible reasons for the results in section 3 and briefly discusses the implications for average subsidy payments.

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[1] *Aged Care Funding Instrument Review*, report by Access Economics for the Department of Health and Ageing, January 2007.

[2] *Testing the distribution of ACFI appraisals,* report by Access Economics for the Department of Health and Ageing, February 2008.

2. DATA

Access Economics understands that ACFI appraisals of existing residents are being done as their RCS appraisals expire. The Department provided Access Economics with data on approximately 33,000 appraisals. For this report, we did not consider appraisals which are 'New appraisal, entry from hospital'. The main ACFI National Trial data also excluded such appraisals. We also removed appraisals with duplicate SPARC ID's.

The final data set contains 31,804 appraisals, of which 28,290 are reappraisals and 3,514 are new appraisals.[3] The data for reappraisals also includes the previous RCS category and the reason for reappraisal, which could be reappraisal on transfer, reappraisal of no funding, care needs re-assessed, major change appraisal and major change reappraisal. The previous RCS categories are used in the analysis, but the reason for reappraisal codes are not.

However, we note that near 25,000 of the reappraisals are under the care needs reassessed category, which means that their RCS classification has simply expired.

The sample in the ACFI National Trial

The choice of residents for ACFI appraisals is therefore similar to the sample selection in the ACFI National Trial. [4] In the latter, the sample included, for each facility:

❑   Up to five residents currently undergoing an RCS.

❑   Enough residents who recently undertook an RCS appraisal to make the number of trial participants up to ten.

However, the Trial data is different in that the RCS appraisals were redone and were therefore up-to-date. The Report on the National Trial is not explicit on whether the Trial included residents new to a facility.

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[3] An appraisal was considered to be a reappraisal of the person had an existing RCS category. One thousand and eighty five of the observations had Reappraisal Reason coded as 'NEW'. According to the Department, those observations are for RCS residents who transferred to another facility post 20 March. We have included the observations in the analysis as reappraisals.

[4] See p 44 of *Report on the National Trial of the Aged Care Funding Instrument (ACFI)*, 20 June 2006, draft report to the Department.

3. THE DISTRIBUTION OF ACFI APPRAISALS

3.1 REAPPRAISALS AND NEW ENTRANTS

Figure 1, Figure 2 and Figure 3 show the distributions of reappraisals and new entrants across the three ACFI domains, ADL, Behavioural and Complex Health Care, respectively. The figures show that the reappraisals have higher level of need in all three domains, with the differences particularly pronounced in the High levels of the ADL and Behavioural domains. The differences are not surprising, given that the reappraisals include elements of increased dependency (from RCS categories that are up to one year old) and 'major change reappraisals'.

FIGURE 1: DISTRIBUTION OF ACFI APPRAISALS - ADL
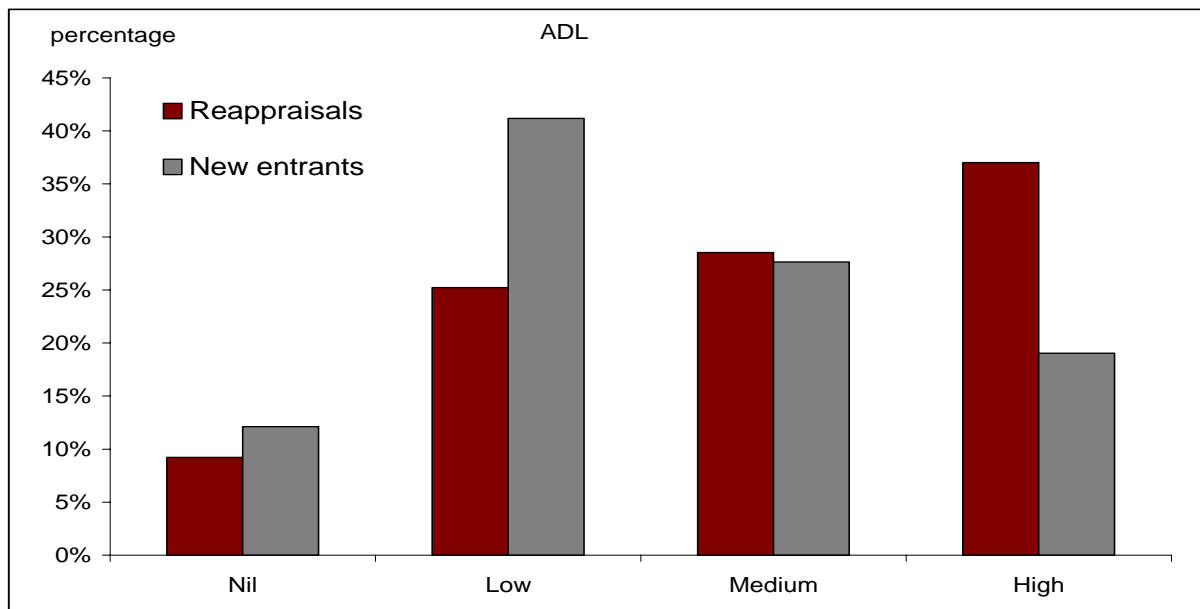
FIGURE 2: DISTRIBUTION OF ACFI APPRAISALS - BEHAVIOURAL
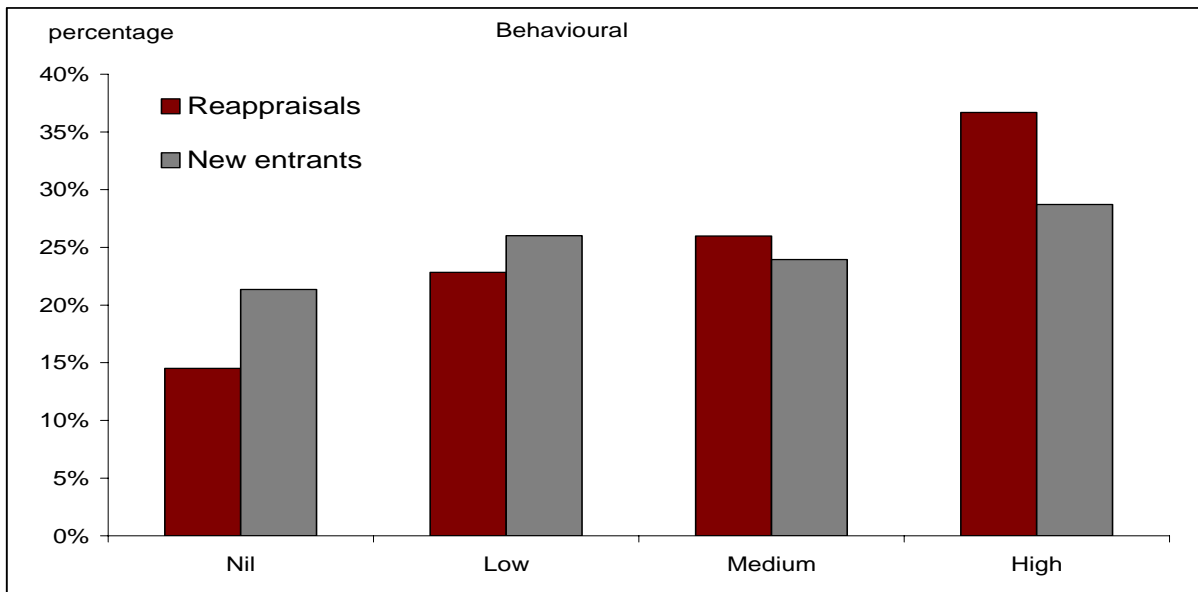
FIGURE 3: DISTRIBUTION OF ACFI APPRAISALS – COMPLEX HEALTH CARE
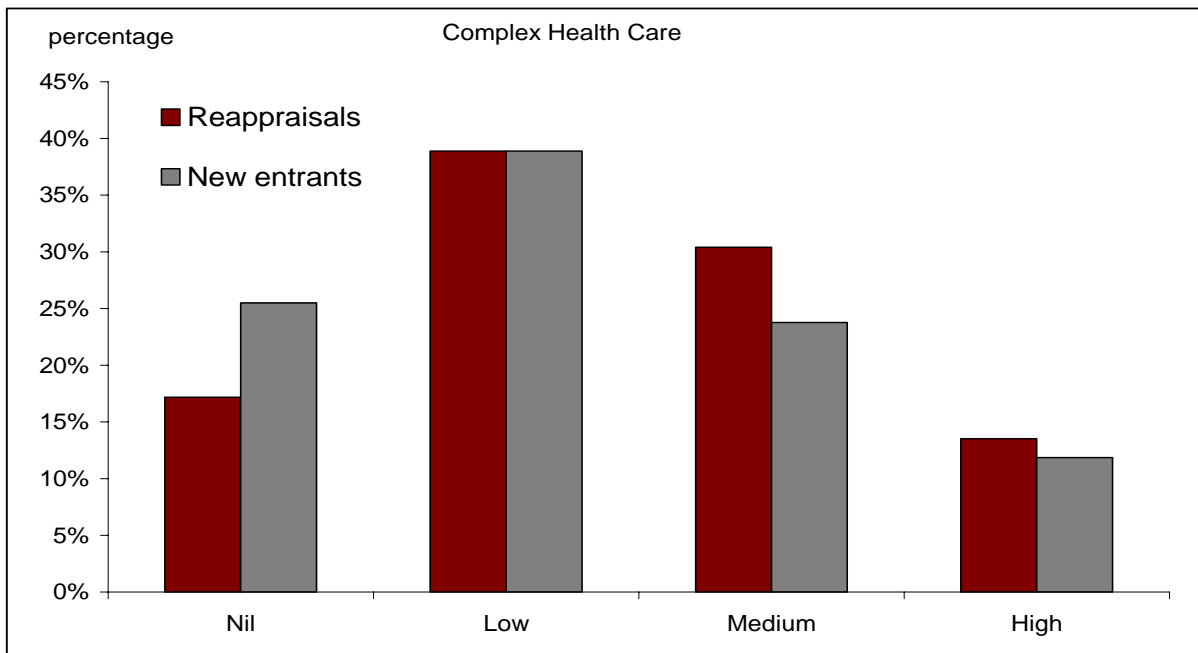
3.2 COMPARISON WITH ACFI NATIONAL TRIAL

Figure 4, Figure 5 and Figure 6 show the comparisons of the distributions of appraisals in the three ACFI domains from:

❑ The post 20 March 2008 ACFI appraisals – reappraisals (first column in each set), new entrants (second column) and all appraisals (third column) – and,

❑ The ACFI National Trial (fourth column),

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for the ADL, Behavioural and Complex Health Care domains, respectively. The results for reappraisals and all appraisals are similar because the results for all appraisals are a weighted average of those for reappraisals and new entrants, with 89% of the weight going to reappraisals.[5]

Table 3-1 gives the values.

Of perhaps most interest is the comparison of the post 20 March 2008 appraisals with those from the ACFI National Trial. The recent appraisals have:

❑   More classifications at the High level in the ADL and Behavioural domains than in the ACFI National Trial; and,.

❑   Fewer classifications at the Nil and High levels in the Complex Health Care domain than in the National Trial..

The impression from the figures is that the actual proportions of residents in each ACFI category vary from the estimates provided in the previous modelling. We now apply the statistical test recommended in the Access Economics report prepared for the Department, *Testing the distribution of ACFI appraisals* (February 2008).

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[5] 28290 / (28290+3514) x 100 = 89%.

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FIGURE 4: ADL DISTRIBUTION, APPRAISALS AND FROM NATIONAL TRIAL

FIGURE 5: BEH DISTRIBUTION, APPRAISALS AND FROM NATIONAL TRIAL

FIGURE 6: CHC DISTRIBUTION, APPRAISALS AND FROM NATIONAL TRIAL

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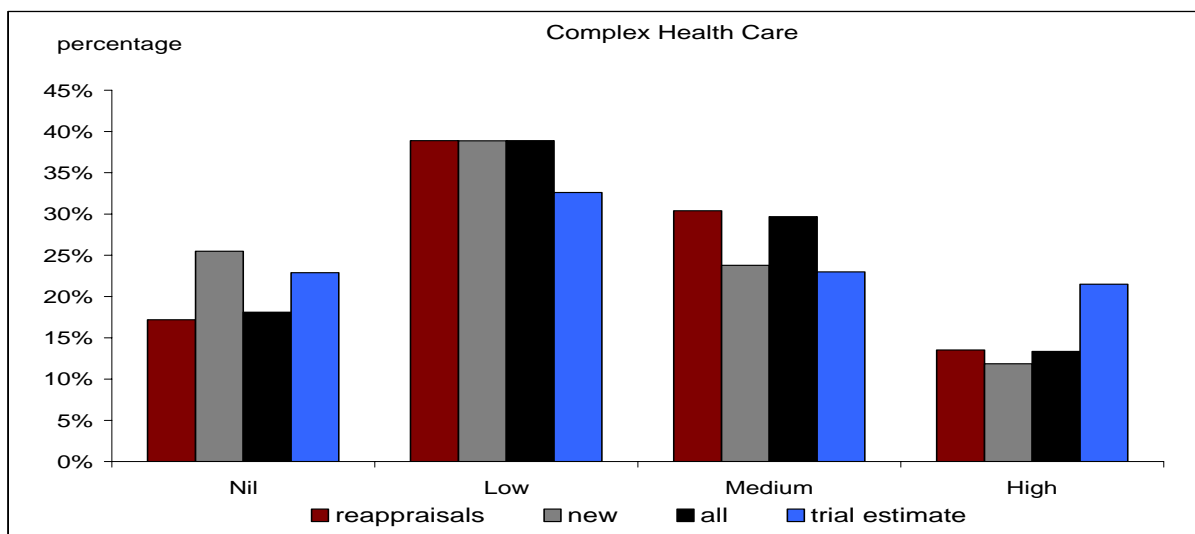
TABLE **3-1: ACFI** **D**ISTRIBUTIONS **(%)**
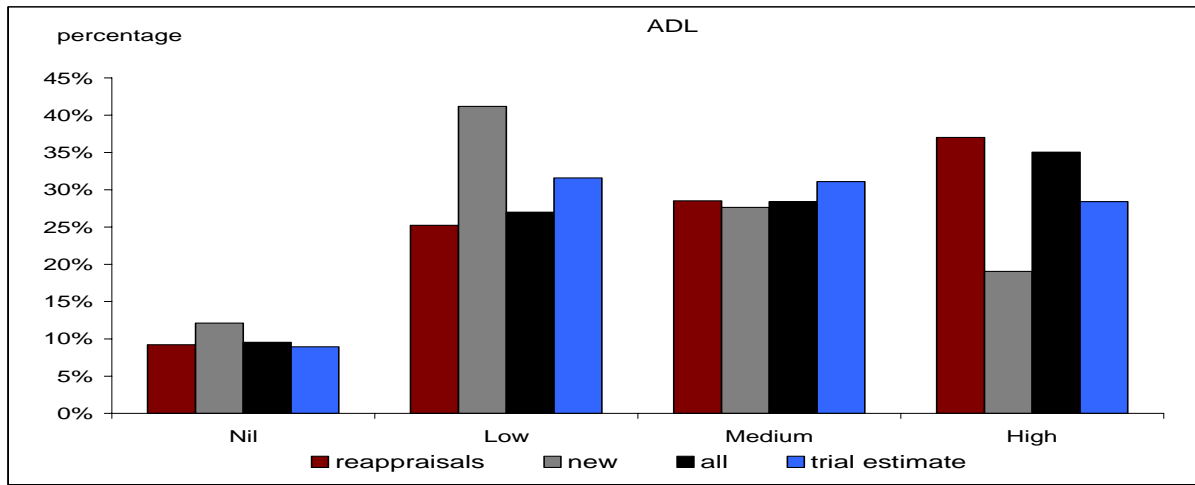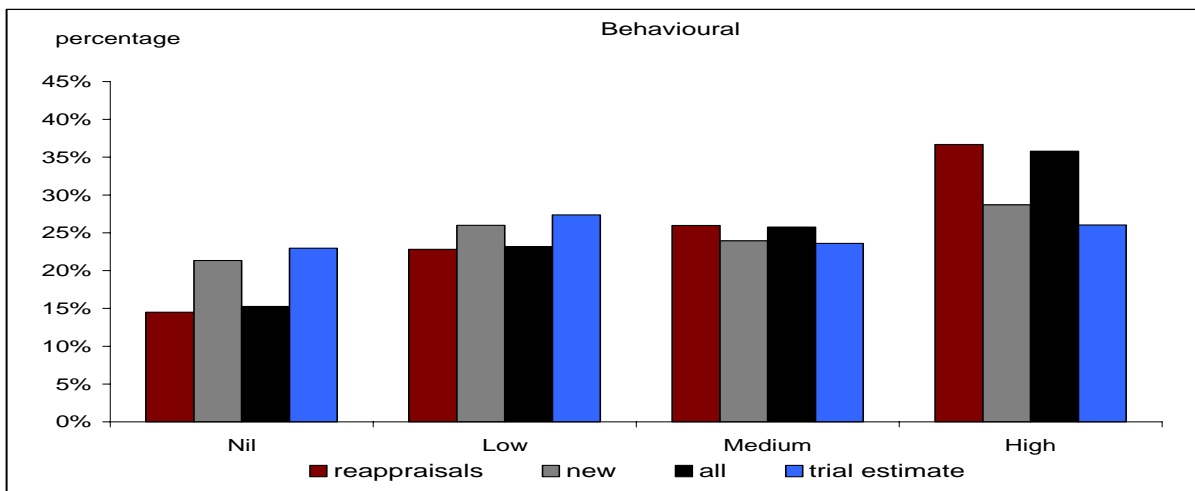
	Reappraisals	New entrants	All appraisals	National Trial estimates
ADL				
Nil	9	12	10	9
Low	25	41	27	31
Medium	29	28	28	31
High	37	19	35	29
Behavioural				
Nil	15	21	15	22
Low	23	26	23	27
Medium	26	24	26	24
High	37	29	36	27
Complex Health Care				
Nil	17	25	18	22
Low	39	39	39	32
Medium	30	24	30	24
High	13	12	13	22

3.3   TESTING THE DIFFERENCES IN THE PROPORTIONS

Access Economics recommends using the chi-squared goodness of fit test. That test is used to test whether the distribution of a set of data follows a particular pattern.   The pattern here is that implied by the proportions in the ACFI National Trial (seen in the fourth bar in each set of bars in Figure 4, Figure 5 and Figure 6 and in the final column of Table 3-1). The test is applied separately to each of the ACFI domains. We also apply the test over the full set of 64 ACFI levels.

3.3.1   TESTING THE THREE ACFI DOMAINS

In symbols, the test statistic for each domain has the form:

$$X^2 \;=\; \sum_{i=0}^{3} \frac{(O_i - E_i)^2}{E_i}$$

where $i=0, 1, 2, 3$ are the three ACFI levels, the O_i ($i = 0, 1, 2, 3$) are the actual numbers of appraisals in levels 0, 1, 2 and 3 in one of the ACFI domains, and the E_i ($i = 0, 1, 2, 3$) are the expected numbers of appraisals in levels 0, 1, 2 and 3 based on the distribution in the ACFI National Trial. Thus, the test is based on the differences between the observed numbers of appraisals in the four levels and the expected numbers, if the distribution followed that in the ACFI National Trial.

The test statistic can also be written in terms of the proportions in Table 3-1:

$$X^2 \;=\; n\sum_{i=0}^{3} \frac{(p_{1i} - p_{0i})^2}{p_{0i}}$$

where the p_{1i} are the proportions in the post 20 March 2008 data, columns 2-4 of Table 3-1; the p_{0i} are proportions in the ACFI National Trial, in column 5 of Table 3-1; and n is the number of appraisals of interest (28277, 3508 and 31785 for reappraisals, new entrants and all appraisals, respectively).

In large samples (as we have here), the test statistic is approximately distributed as a chi-squared random variable with degrees of freedom equal to the number of categories less one (three in this case). Hence, we reject the hypothesis that the actual proportions of residents in each ACFI category are consistent with the previous modelling if the test statistics exceeds the critical value from the chi-squared random variable with three degrees of freedom.

In the Access Economics report prepared for the Department, *Testing the distribution of ACFI appraisals* (February 2008), we recommended that the tests be done with a confidence level of 99.66%. In that way, the confidence level when the results form the three tests are combined will be approximately 99%. Thus the critical value in the test is 13.66.

Table 3-2 gives the test statistics. **The proportions implied by the ACFI National Trial data are rejected in all cases.**

TABLE 3-2: CHI-SQUARED TEST STATISTICS

	Reappraisals	New entrants	All appraisals
ADL	1161	264	788
Behavioural	2389	16	2249
Complex Health Care	2258	206	2306

Table 3-3 gives the results for the slightly more general test that the proportions at levels 0,1,2,3 are the same in each of the domains ('homogeneity'). The test has the same form as the chi-squared test above, except that the expected proportions (the p_{0i}) are estimated in the data obtained by aggregating the National Trial and post 20 March 2008 data. In part, the test acknowledges the fact the ACFI National Trial data is itself a sample and hence is subject to sampling error. The critical values are taken from a chi-squared distribution with 3 degrees of freedom, implying that the null hypotheses are rejected at the 99.66% confidence level in all but one case (which is shaded).

TABLE 3-3: CHI-SQUARED TEST STATISTICS FOR HOMOGENEITY

	Reappraisals	New entrants	All appraisals
ADL	159	154	98
Behavioural	367	9	308
Complex Health Care	375	137	355

It should also be noted that applying the chi-squared test to the historical RCS distributions also leads to test statistics of the order of those in Table 3-2 and Table 3-3. In other words, the distribution of subsidy levels of residents in aged care is often not constant through time. We give examples of that in the section 4.

3.3.2   TESTING INDIVIDUAL LEVELS

The chi-squared test in a particular ACFI domain (ADL, behavioural or complex health care) tests the joint hypothesis that the proportions of reappraisals at levels 0, 1, 2 and 3 are the same as those in the ACFI National Trial. It is also possible to apply tests to the four individual levels. The proportions sum to one, implying that the tests are correlated across the four levels.

The test statistics have the form:

$$ t_i \quad = \quad \left| \sqrt{n} \, \frac{p_{1i} - p_{0i}}{\sqrt{p_{0i}(1 - p_{0i})}} \right| $$

for $i = 0, 1, 2, 3$. In the case in which only a single test is run, the critical value for the test is taken from a standard normal distribution. If a series of tests is run ($i = 0, 1, 2, 3$), then the critical value of the individual tests should be adjusted to maintain the size of the overall procedure.

Table 3-4 shows how the proportions of reappraisals across levels differ from the proportions in the ACFI National Trial (multiplied by 100). The values are the differences between the first and last columns of Table 3-1.

TABLE 3-4: DIFFERENCE IN PROPORTIONS (REAPPRAISALS)

level	ADL	Behavioural	Complex health care
Nil	0.28	-8.46	-5.70
Low	-6.34	-4.55	6.28
Medium	-2.56	2.36	7.41
High	8.62	10.64	-7.99

Table 3-5 gives the values of the test statistics, and Table 3-6 and Table 3-7 give the test statistics for the new entrants and all appraisals. The critical value is 3.45, giving an overall size of at most 1% (confidence level of 99%) across the 36 tests from the 4 levels x 3 domains x 3 data sets (reappraisals, new entrants and all appraisals). In most cases, the test statistic exceeds the critical value – the proportions are generally different from those in the ACFI National Trial. The shaded values are for the tests that do not reject the proportions in the ACFI National Trial.

TABLE 3-5: T-TESTS FOR INDIVIDUAL DIFFERENCES (REAPPRAISALS)

Level	ADL	Behavioural	Complex health care
Nil	1.7	33.8	22.8
Low	22.9	17.1	22.5
Medium	9.3	9.4	29.6
High	32.1	40.8	32.7

TABLE 3-6: T-TESTS FOR INDIVIDUAL DIFFERENCES (NEW ENTRANTS)

level	ADL	Behavioural	Complex health care
Nil	6.6	2.3	3.7
Low	12.3	1.8	7.9
Medium	4.4	0.5	1.1
High	12.3	3.6	13.9

TABLE 3-7: T-TESTS FOR INDIVIDUAL DIFFERENCES (ALL APPRAISALS)

level	ADL	Behavioural	Complex health care
Nil	3.8	32.6	20.3
Low	17.6	16.8	23.9
Medium	10.2	9.0	28.3
High	26.2	39.6	35.5

3.3.3 TESTING THE 64 ACFI LEVELS

The test statistic for the full set of 64 levels has the form:

$$X^2 \;=\; \sum_{i=0}^{63} \frac{\left(O_i - E_i\right)^2}{E_i}$$

where $i=0, ..., 63$ are the 64 ACFI levels, the O_i ($i = 0, ..., 63$) are the actual numbers of appraisals in levels 0, …, 63 and the E_i ($i = 0, ..., 63$) are the expected numbers of appraisals in levels 0, …, 63 based on the distribution in the ACFI National Trial. Thus, the test is based on the differences between the observed numbers of appraisals in the 64 levels and the expected numbers, if the distribution followed that in the ACFI National Trial.

The test statistic can also be written in terms of the proportions:

$$X^2 \;=\; n\sum_{i=0}^{63} \frac{\left(p_{1i} - p_{0i}\right)^2}{p_{0i}}$$

where the p_{1i} are the proportions in the post 20 March 2008 data, the p_{0i} are proportions in the ACFI National Trial, n is the number of appraisals of interest. We only apply the test to the reappraisals so $n = 28277$.

We reject the hypothesis that the actual proportions of residents in the ACFI levels are consistent with those in the ACFI National Trial if the test statistic exceeds the critical value from the chi-squared random variable with sixty three degrees of freedom. The confidence level in the test is 99%, giving a critical value of 88.38.

Figure 7 shows the distributions across the 64 ACFI levels from the ACFI National Trial (solid line) and the reappraisals (dashed line). The levels are ordered according to the value of the ACFI subsidy (as detailed in section 4).

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FIGURE 7: DISTRIBUTION ACROSS ALL ACFI LEVELS
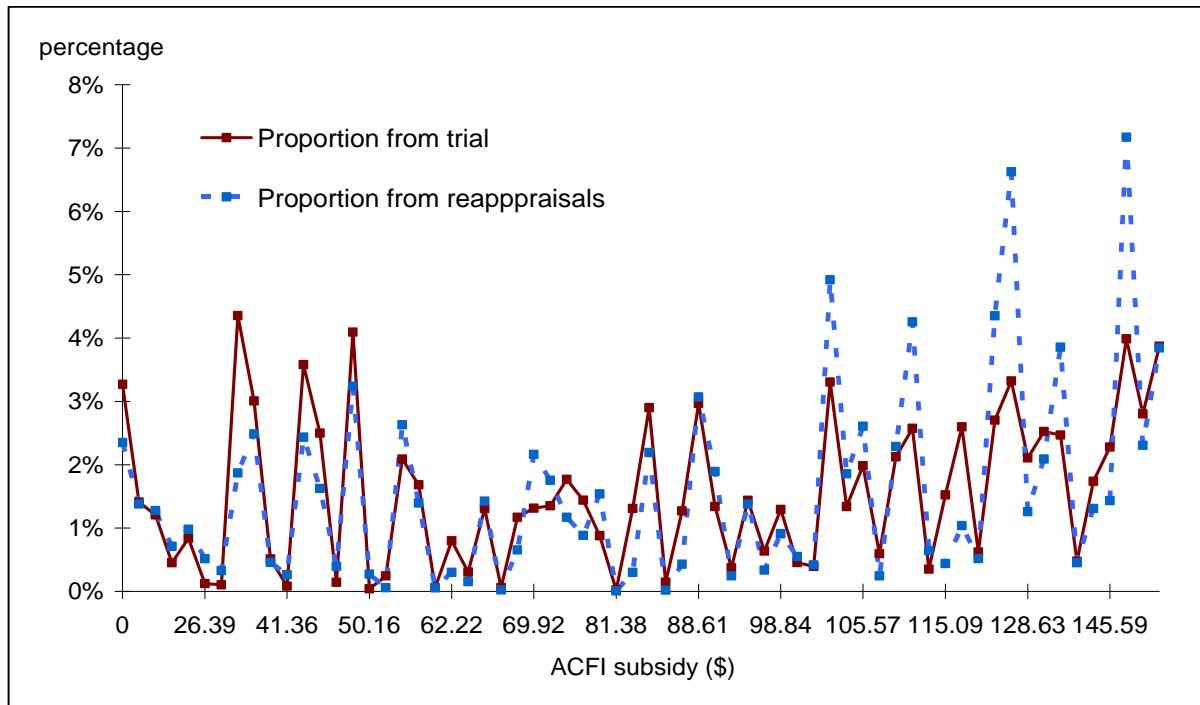
The test statistic has a value of 6,911, which exceeds the critical value of 88.38 – **the proportions implied by the ACFI National Trial data are rejected.**

3.3.4   TESTING THE 64 LEVELS INDIVIDUALLY

The test statistics have the form:

$$ t_i \quad = \quad \left| \sqrt{n} \, \frac{p_{1i} - p_{0i}}{\sqrt{p_{0i}(1 - p_{0i})}} \right| $$

for $i = 0, 1, ..., 63$, where the p_{1i} are the proportions in the post 20 March 2008 data, the p_{0i} are proportions in the ACFI National Trial and n is the number of appraisals of interest. We only apply the test to the reappraisals so $n = 28277$. The critical value of 3.60 gives an overall size of at most 1% (confidence level of 99%).

Table 3-8 gives the values of the test statistics. The bins are ordered by the value of the ACFI subsidy (as detailed in section 4). N, L, M and H in column 1 stand for the ACFI levels, Nil, Low, Medium and High. The shaded values highlight the 17 bins in which the proportions in the ACFI National Trial are not rejected.

TABLE 3-8: T-TESTS OF INDIVIDUAL ACFI LEVELS

ADL/BEH/CHC	ACFI subsidy ($)	Test statistic
NNN	0.00	8.70
NLN	6.53	0.43
NNL	12.85	1.09
NMN	13.54	6.57
NLL	19.38	2.61
NML	26.39	18.73
NHN	28.51	11.76
LNN	28.56	20.49
LLN	35.09	5.11
NNM	36.62	1.28
NHL	41.36	10.59
LNL	41.41	10.38
LMN	42.10	9.42
NLM	43.15	11.26
LLL	47.94	7.24
NMM	50.16	19.29
NNH	52.87	6.42
LML	54.95	6.35
LHN	57.07	3.78
NLH	59.40	0.31
MNN	62.22	9.41
NHM	65.13	4.60
LNM	65.18	1.72
NMH	66.41	2.72
MLN	68.75	8.07
LHL	69.92	12.52
LLM	71.71	5.86
MNL	75.07	7.61
MMN	75.76	7.84
LMM	78.72	11.83
NHH	81.38	1.57
LNH	81.43	14.93
MLL	81.60	7.07
HNN	86.19	5.63
LLH	87.96	12.65
MML	88.61	1.01
MHN	90.73	8.09
HLN	92.72	3.52
LHM	93.69	0.84
LMH	94.97	6.35

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MNM	98.84	5.73
HNL	99.04	2.48
HMN	99.73	0.64
MHL	103.58	15.19
MLM	105.37	7.58
HLL	105.57	7.53
LHH	109.94	7.71
MMM	112.38	1.86
HML	112.58	17.87
HHN	114.70	8.27
MNH	115.09	14.89
MLH	121.62	16.51
HNM	122.81	2.21
MHM	127.35	17.07
HHL	127.55	30.96
MMH	128.63	9.92
HLM	129.34	4.66
HMM	136.35	15.03
HNH	139.06	0.62
MHH	143.60	5.52
HLH	145.59	9.54
HHM	151.32	27.37
HMH	152.60	5.05
HHH	167.57	0.21

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4. DISCUSSION OF THE RESULTS

The actual proportions of residents in each ACFI category could vary from the estimates provided in the previous modelling (the ACFI National Trial) for a number of reasons. We consider two:

1   The characteristics of the residents under appraisal are different in some way from those in the ACFI National Trial.

2   The characteristics of the residents are the same, but the mapping from RCS to ACFI is different from that in the ACFI National Trial. In other words, for a person with given RCS level, the ACFI appraisals are resulting in different ACFI scores.

The characteristic we observe is the RCS level.

4.1   THE RCS DISTRIBUTIONS

Figure 8 shows the RCS distributions for:

❑   Recipients of Residential Aged Care as of 30 June 2006 (about the time of the ACFI National Trial).

❑   Recipients of Residential Aged Care as of 30 June 2007.

❑   Recipients of Residential Aged Care as of 31 December 2007.

❑   Individuals in the ACFI National Trial.

❑   Individuals with RCS scores who have been reappraised using the ACFI post 20 March 2008.

FIGURE 8: RCS DISTRIBUTIONS
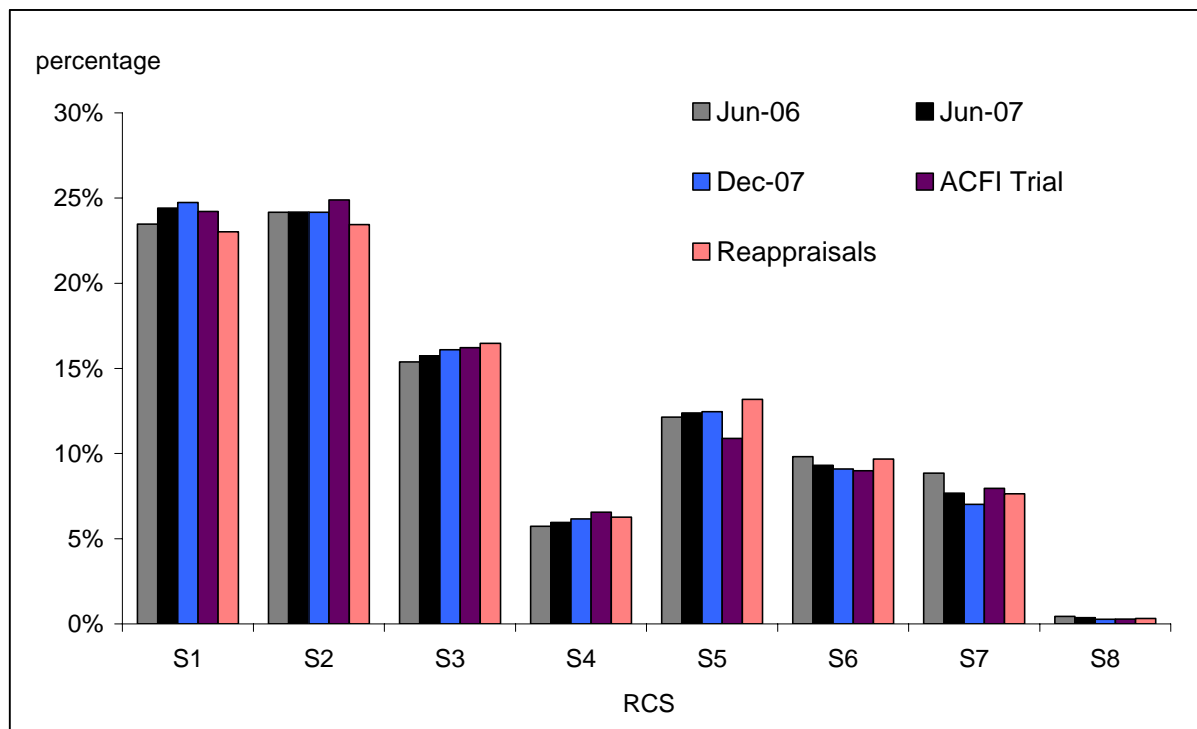
The figure shows that the proportions of reappraisals post 20 March 2008 at RCS levels 1 and 2 are less than those in the other populations. The differences between the proportions in the reappraisals and the proportions at December 2007 are also greater than the differences between the June 2006 and June 2007 proportions and between the June 2007 and December 2007 proportions. That suggests that the differences may be greater than those from natural variations in the populations.

The proportions in the reappraisals at RCS levels 1 and 2 being less than the proportions in the other populations is not surprising. The RCS levels for the reappraisals are one year old whereas those in the other populations are significantly less than that. Those in the ACFI National Trial were recent (see section 2) while it is reasonable to expect that those in the 30 June and 31 December populations were approximately six months old on average. The RCS distribution of the reappraisals would presumably have included more mass at RCS levels 1 and 2 (due to increased dependency over the one year period) had the residents received new RCS appraisals rather than ACFI appraisals.

For example, suppose that a 50% of residents increase their dependency by an RCS level each year. In that case, the RCS distribution of the reappraisal would have 34.7% of residents at RCS 1 and 20.0% of residents at RCS 2. (The overall RCS distribution would not be like that because a portion of all residents at RCS 1 and RCS 2 a year ago have left the system over the past year.)

Chi-squared test statistics

Testing the null hypothesis that the June 2007 distribution is the same as the June 2006 distribution gives a chi-squared test statistic of 224. Testing December 2007 against June 2007 gives a test statistic of 87. In both cases the null hypothesis is rejected at the 99.8% confidence level, suggesting that the distribution of subsidy levels of residents in aged care is not constant through time.

The same conclusion applies in the test of the hypothesis that the RCS distribution for those who have had reappraisals post 20 March 2008 is same as that in the ACFI National Trial.

4.2   THE RCS TO ACFI MAPPING

Next, we test the mapping from RCS to ACFI. We passed the RCS levels of residents who have been reappraised post 20 March 2008 through the RCS to ACFI mapping implied by the ACFI National Trial data. That gives a prediction of what the ACFI distribution would look like if the mapping in the ACFI National Trial is still appropriate (except for increased dependency).

Figure 9, Figure 10 and Figure 11 give the results. The first column of each set of three is the actual percentage in the reappraised residents. The middle column is the estimate from combining the RCS levels of those residents with the RCS to ACFI mapping implied by the ACFI National Trial data. The third column is the percentage in the ACFI National Trial.

The first column is equivalent to passing the RCS levels of the reappraised residents through a 'current' RCS to ACFI mapping – that implied by the RCS and ACFI levels for the reappraised residents. Thus, the difference between columns 1 and 2 reflects the change in the RCS to ACFI mapping between that in the National Trial and that in the reappraised residents, with the same qualification that the current mapping include the increased dependency discussed earlier.

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We highlight one point of difference: Figure 8 shows that there are relatively fewer reappraised residents whose last RCS level was 1 or 2 than in the ACFI National Trial. That is consistent with the generally lower predicted proportions at the Medium and High levels in all three ACFI domains (the middle bar in each set), although perhaps not to the extent observed in Figure 9 and Figure 10. But the results for the CHC domain are not consistent – the proportion at the High level from applying the mapping exceeds the actual proportion. Allowing for increased dependency would make the difference even larger.

In other words, that result suggests that the mapping with respect to the CHC domain has changed in some way.

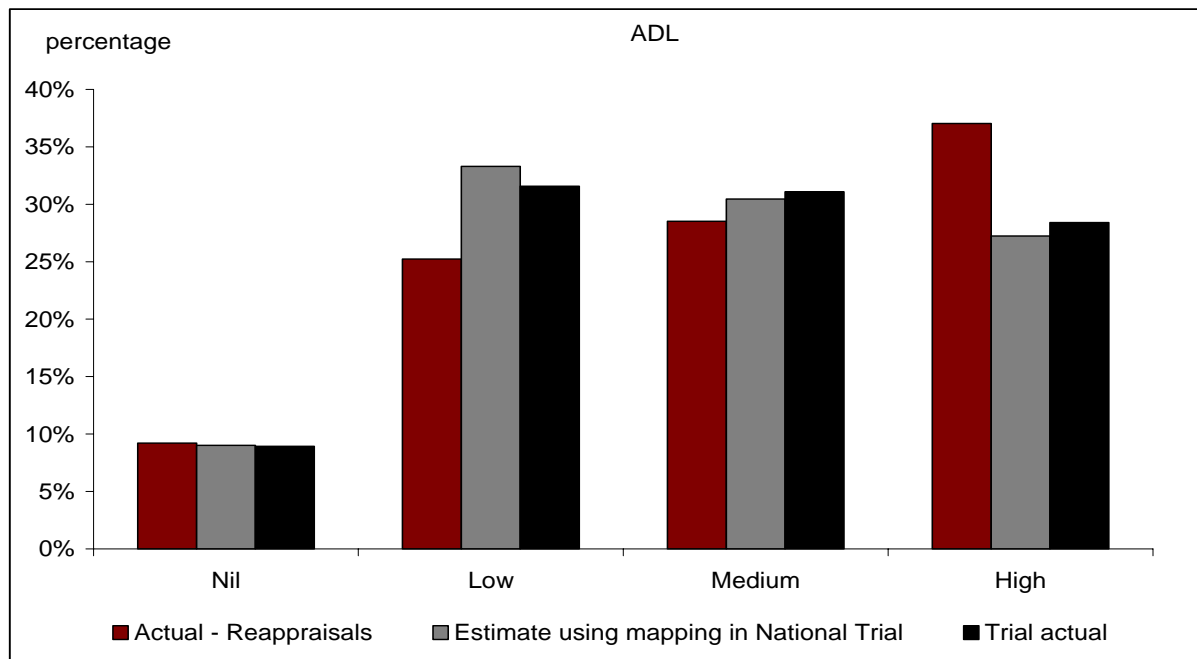**FIGURE 9: ADL DISTRIBUTION, REAPPRAISALS AND FROM NATIONAL TRIAL**

FIGURE 10: BEH DISTRIBUTION, REAPPRAISALS AND FROM NATIONAL TRIAL
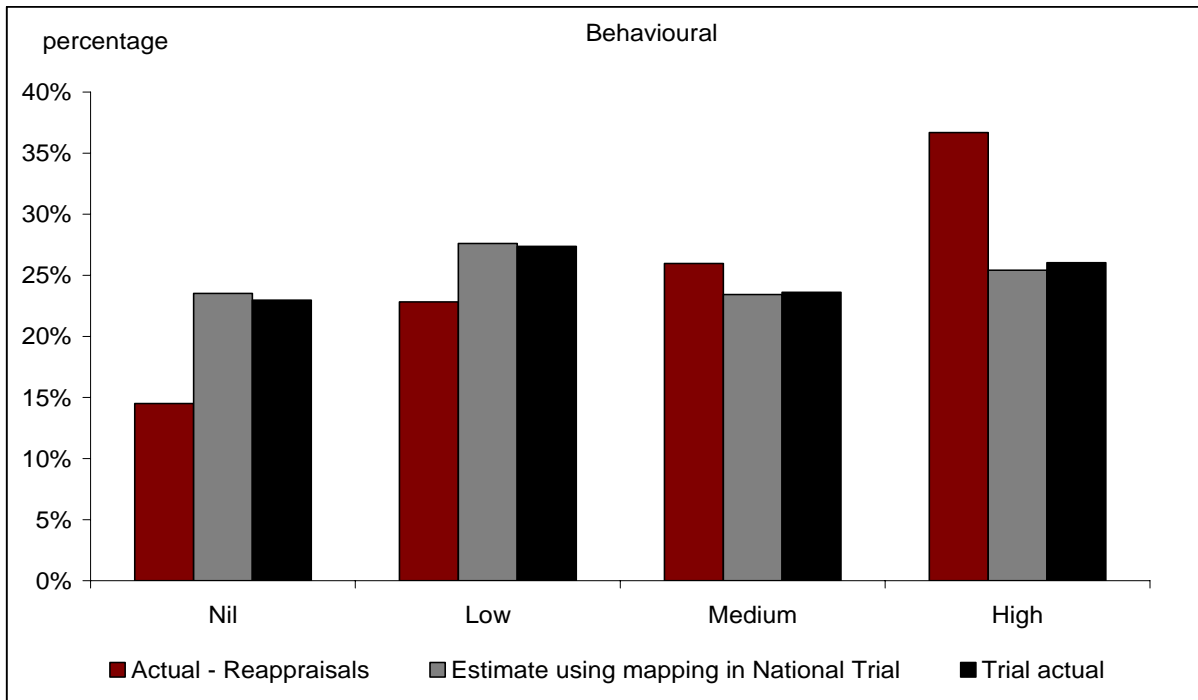

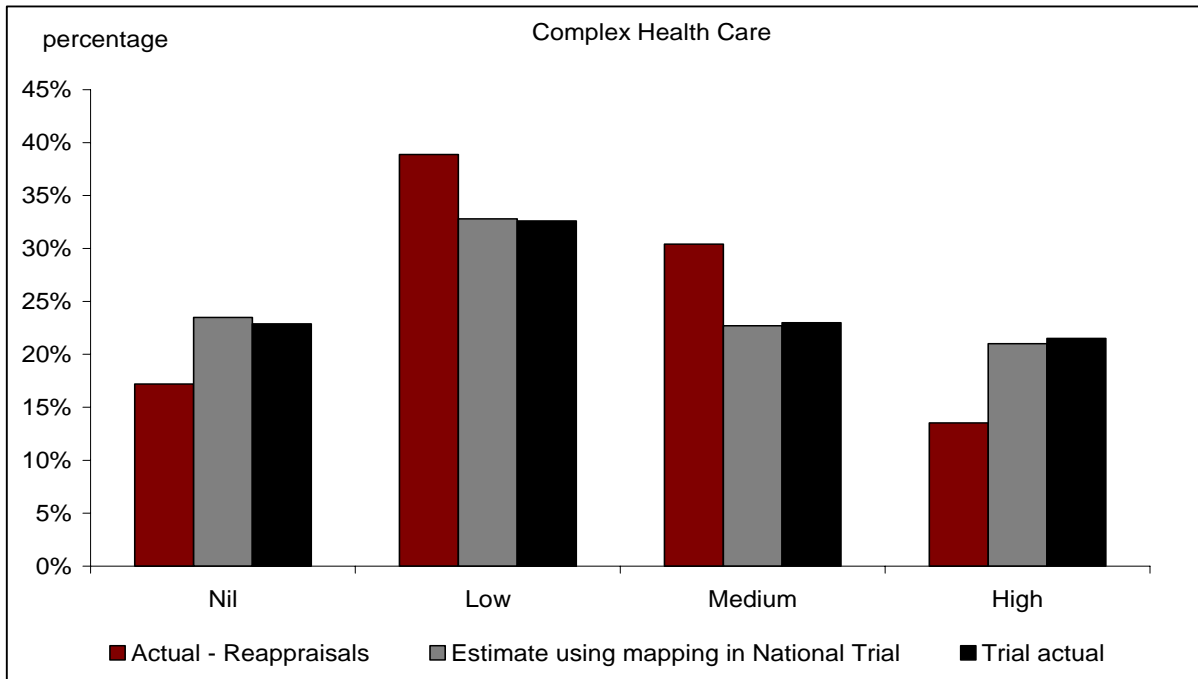**FIGURE 11: CHC DISTRIBUTION, REAPPRAISALS AND FROM NATIONAL TRIAL**

4.3   WHAT DO THE RESULTS IMPLY ABOUT SUBSIDY PAYMENTS?

Access Economics has looked briefly at the implications of the results for subsidy payments. The daily subsidy rates are shown in Table 4-1. Combining those with the distributions across levels with the ACFI domains gives the average daily subsidies. The calculations

ignore grandparenting and the current '$10 more than RCS 1 rate' cap on ACFI subsidy rates, and so allow a direct comparison between the setting of ACFI and RCS rates.

TABLE 4-1: DAILY ACFI SUBSIDY RATES ($)

	ADL	BEH	CHC
Nil	0	0	0
Low	28.56	6.53	12.85
Medium	62.22	13.54	36.62
High	86.19	28.51	52.87

Table 4-2 shows the average daily subsidy rates for new entrants and reappraisals post 20 March 2008, as well as those based on the distribution of residents in the ACFI National Trial.

TABLE 4-2: ESTIMATED SUBSIDY RATES ($)

Population	ADL	Behavioural	CHC	ACFI total	RCS	RCS + 50% AIP
New entrants	45.38	13.12	19.97	78.48		
Reappraisals	56.87	15.46	23.28	95.61	86.86	92.90
ACFI Trial	52.84	12.41	23.98	89.23	88.84	

The following two points are as expected.

❑   The average ACFI subsidy rate for new entrants is significantly less than that for reappraisals ($78.48 versus $95.61).

❑   The average subsidy levels under ACFI and RCS are similar in the ACFI National Trial ($89.23 versus $88.84). That is expected given that the ACFI rates were determined using the ACFI National Trial data.

A third point suggests that the RCS levels of the reappraisals are not that different from those in the ACFI National Trial:

❑   The average subsidy levels using the RCS distributions are similar for reappraisals and residents in the ACFI National Trial ($86.86 versus $88.84).

But more importantly:

❑   The average ACFI subsidy rate for reappraisals is significantly above that for the residents in the ACFI National Trial ($95.61 versus $89.23). Relative to the ACFI National Trial, the reappraisals have:

  ▪   A higher proportion at the high level of the ADL domain and lower proportions at the low and medium levels. That essentially means more payments for residents of $86.19 and fewer of $28.56 and $62.22. The average increases. Similar logic applies to the Behavioural domain.

  ▪   A lower proportion at the high level of the Complex Health Care domain and higher proportions at the low and medium levels. That essentially means fewer payments for residents of $52.87 and more of $12.85 and $36.62. But the gains and losses nearly offset and the difference in the average payments is small.

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Figure 12 (which repeats Figure 7) highlights the differences. The figure shows the distribution of reappraisals (dashed line) and ACFI National Trial appraisals (solid line) across the 64 possible payment levels. The spikes in the reappraisals curve towards the right hand side of the figure are where the proportions of the reappraisals greatly exceed the proportions in the ACFI National Trial. The spikes correspond to the ACFI levels {MHL, HML, MHM, HHL, HMM, HHM}.

FIGURE 12: DISTRIBUTION OF ACFI SUBSIDIES
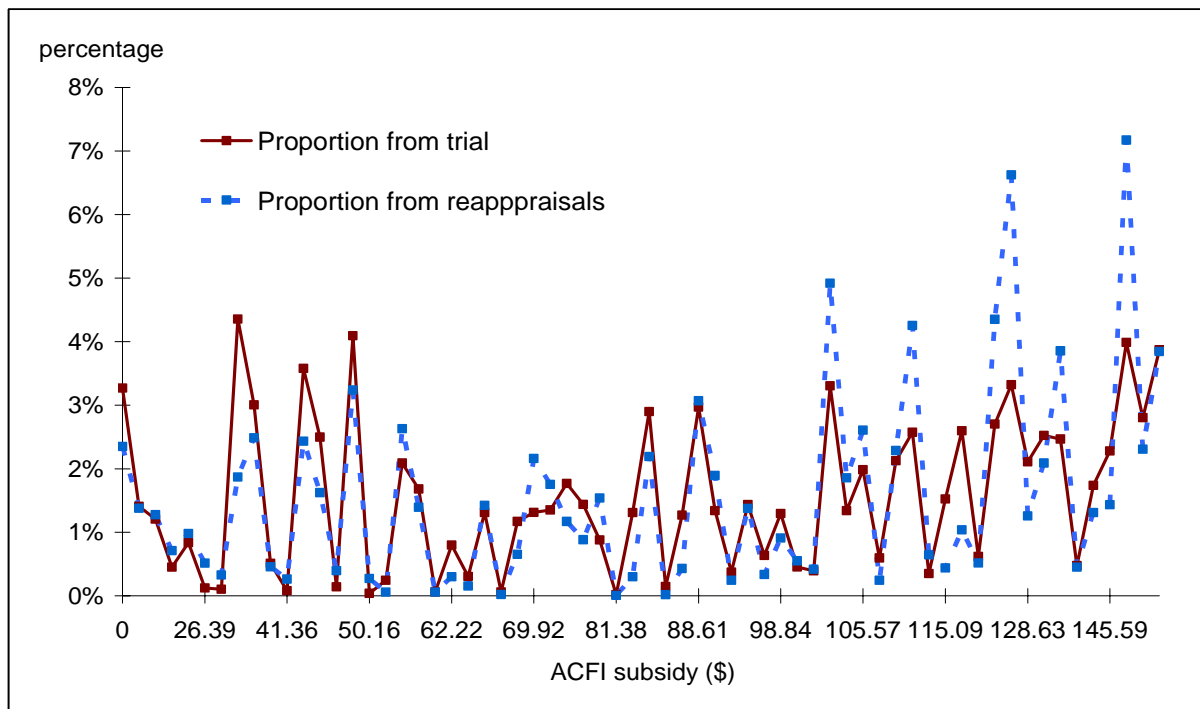
Finally,

❑ The average subsidy payment for reappraisals is significantly higher under ACFI subsidy rates than under the RCS rates, based on their last RCS level ($95.61 versus $86.86). As above, there are two parts to that: increased dependency and 'unexpectedly' higher ACFI appraisals.

In order to investigate those two parts, we estimate what the average RCS subsidy rate would have been under an assumption about the increased dependency of the residents. We assume that 50% of residents at RCS levels 2 to 8 move up one RCS level over the year. The RCS distribution of the reappraisal would have 34.7% of residents at RCS 1, 20.0% at RCS 2 and so on. The average RCS subsidy level would be $92.90 – above that in the ACFI National Trial ($88.84) but still less that the average subsidy level under ACFI ($95.61).

4.4   CONCLUDING COMMENTS

There is evidence that the distribution of ACFI appraisals is different from that implied by the ACFI National Trial, and is more concentrated towards higher subsidy levels. This report has so far discussed two main explanations for that:

1   The distribution of the observed characteristic of residents being reappraised (their RCS levels) is different from those in the ACFI National Trial. Part of that is because

the observed RCS levels are up to one year old and the residents may have moved to higher levels of dependency.

2   The underlying mapping from RCS to ACFI – the way in which residents under RCS are being appraised under ACFI – is different from that in the ACFI National Trial, and is resulting in more appraisals at higher levels in the ADL and Behavioural domains.

A simple correction for the increased dependency suggested that elements of both explanations are present. Better separating the two effects requires a better estimate of the extent of increased dependency in the reappraised residents. That could be obtained by looking at recent historical data on RCS appraisals, in which the patterns of RCS reappraisals for residents are observed (controlling for other observed variables such as age, gender and length of time in residence). Alternatively, it may be possible to revisit the ACFI National Trial data and 'decrease the dependency' of the residents to their previous RCS levels.

Other explanations of the differences are that:

❑   The sample of residents in the ACFI National Trial is not representative of the care needs of the current population of residents.

❑   The reappraised residents are not representative of the rest of the current population of residents.

Increased dependency will also occur in the new entrants and the existing residents who have transferred to the ACFI system. But the pattern of that increased dependency cannot be determined until reappraisals under ACFI begin.

Finally, whether the current analysis should be repeated as more ACFI appraisals become available (over the next year, say) would depend on the aims of any further analysis, and the relative weight given to higher than expected versus lower than expected subsidy levels.