



EMCN

EDUCATION MANDATED COST NETWORK

REPRESENTING OVER FOUR MILLION ADA

REPRESENTING OVER 600 LOCAL EDUCATION AGENCIES

1121 L Street, Suite 1060 • Sacramento, CA 95814 • (916) 446-7517

December 19, 2011

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Ms. Nancy Patton, Acting Executive Director
Commission on State Mandates
980 Ninth Street, Suite 300
Sacramento, CA 95814

RE: CSM # 4487 & 4487A
Habitual Truants
Third-Party Statistical Analysis
Education Mandated Cost Network (EMCN)

Dear Ms. Patton:

In a letter dated August 22, 2011, to Mr. Keith Peterson you granted his request for a 120-day extension of time to submit comments regarding the request to amend parameters and guidelines for the *Habitual Truants* mandate (09-PGA-01, 01-PGA-06 {CSM #4487 & 4487A}). The request was made to provide sufficient time to secure an independent third-party statistical analysis of the cost data. Attached please find the statistical analysis prepared by Capitol Matrix Consulting.

After adjusting for economies of scale related to the number of truants served and eliminating district cost outliers, Capitol Matrix Consulting concludes that a unit cost reimbursement rate of \$26 per habitual truant is appropriate, based on the 2000-01 and 2001-02 data. Adjusting for general inflation, this rate would be \$37 per habitual truant in 2011-12.

Thank you for the Commission on State Mandates' consideration of this analysis as it evaluates an appropriate reasonable reimbursement methodology (RRM) for this program. If you have any questions, please do not hesitate to call Robert Miyashiro at (916) 446-7517, consultant to the Education Mandated Cost Network.

Sincerely,

Colleen Patterson, Chair
Education Mandated Cost Network

cc: Robert Miyashiro, Vice President
School Services of California, Inc.

Submitted to the COSM Drop Box for Service to listed parties.

Statistical Analysis of Mandate Claims for the Habitual Truant Program

By Capitol Matrix Consulting
December 19, 2011

This report presents our statistical analysis of mandate reimbursement claims submitted in 2000-01 and 2001-02 for the Habitual Truant Program (HTP). The purpose of this analysis is to develop a single unit cost rate that could be used under the Reasonable Reimbursement Methodology (RRM) for the HTP.

Summary of Findings

- We believe that a unit cost rate of about \$26 per truant is reasonable based on our analysis of claims data for 2000-01 and 2001-02. This is similar to the weighted average for all districts during the period, and slightly higher than the weighted average that is derived when outliers are removed based on our preferred technique.
- We believe that a RRM based on the weighted average cost method we use would be reliable, in that the rate is dependent on results of the largest districts, which had the lowest per-truant claim amounts, exhibited the least variance, and showed a relatively high degree of consistency between the two years we examined.
- As adjusted for the percent change in the U.S. Implicit Price Deflator for State and Local Government between 2001 and 2011, the \$26 rate would translate into a rate of \$37 in 2011-12.
- Our recommendation assumes that the goal of the RRM is to find a single unit cost rate that is representative of the average costs for all claims for reimbursement from the state, as opposed to a rate that is representative of, for example, per truant costs of a randomly selected district or a mid-sized district. These alternatives would produce a significantly higher unit cost rate.

Background

The Habitual Truant Program was created by Chapters 1184, Statutes of 1975; and Chapter 1010, Statutes of 1976; and modified by Chapter 1023, Statutes of 1994. The program defines a habitual truant and sets forth various requirements for districts to address habitual truancy. In 1997, the Commission on State Mandates (COSM) determined that this

legislation imposed a reimbursable state mandate, and in 1998 it adopted parameters and guidelines that provide reimbursement for four activities:

- Verifying prior trancies, involving the review of school district records to verify the pupil has been reported as a truant at least three times in the same school year.
- Making a conscientious effort to schedule a conference with the pupil's parent or guardian, by sending notices and, if necessary, attempting to make phone contact.
- Scheduling and holding a conference
- Reclassifying pupils as habitual truants.

Between 2001-02 and 2008-09, school districts submitted an average of \$6.7 million in claims per year for the program.

Reasonable Reimbursement Methodology

State law permits the COSM to modify its parameters and guidelines upon the request of a local agency, school district or state agency. It also allows for claims to be developed using a reasonable reimbursement methodology, based on cost information from a representative sample of claimants, information provided by associations of local agencies and school districts, or other projections of local costs.

In 2010, the San Jose Unified School district proposed a reasonable reimbursement methodology based on habitual truant claims submitted by school districts during 2000-01. The district proposed a unit cost of \$32.15 based on the weighted average of district claims, after eliminating districts with the highest claims and lowest claims from the analysis. The State Controller's Office analysis of 2007-08 claims and arrived at an average unit cost rate of \$26.06 based on all claims data from 2000-01 through 2008-09. In mid-2010, the COSM staff recommended that the proposed RRM be denied, citing various concerns raised by the Department of Finance and State Controller, but the COSM granted an extension for the district to address the various concerns raised.

Analysis

For purposes of this study, we analyze claims data provided to us for 2000-01 and 2001-02, which are included in the attachment. Sufficient claims data were available for 602 districts in 2000-01 and 350 districts in 2001-02. In 2000-01, the districts' claims per truant averages ranged from \$2 to \$331 per truant. In 2001-02, the range was from \$6 to over \$6,000 per truant (though, as noted below, the top five claims for 2001-02 were anomalous and excluded from our analysis for that year.)

The data includes the total cost of claims and the total number of habitual truants for each district. It also provides total costs for each of the four reimbursable activities. However, it does not include information regarding the specific number of truants involved in each step. Thus, the data is not amenable to creation of separate reimbursement rates for each activity.

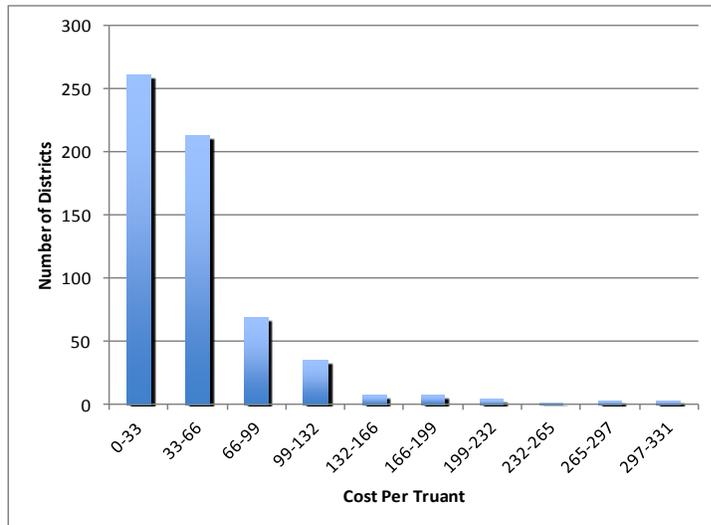
For our analysis, we use all the data reported for 2000-01. However, we omit the top five districts from the 2001-02. The omissions are partly related to the extreme size of the claims per truant for these districts in relation to the other 98% of the respondents for that year. They also are due to anomalies in the reported totals that strongly suggest that the per-average figures reflect major problems with the underlying data.¹ We note that while the omission of these extreme results had a significant impact on the unweighted averages for 2001-02, they did not materially affect the weighted average results, given the extremely small number of truants in the omitted districts (an average of just three truants per district).

Distribution of Costs Per Truant

Figure 1 shows the variation of average costs per truant across the 602 districts reporting claims in 2000-01. It shows that average costs are highly skewed, with nearly 43 percent of the districts reporting average costs of between 0 and \$33 per truant, another 35 percent reporting average costs of between \$33 and \$66 per truant, and the remaining 22 percent of districts reporting claims, in declining frequency, all the way up to over \$330 per truant. A similar pattern holds for 2001-02.

¹ For example, the district with the highest average costs in 2001-02 reported claims of \$8,880 for 152 truants in 2000-01, but claims of \$18,649 for just 3 truants in 2001-02, strongly suggesting that the claim per truant total was

Figure 1
Distribution of Costs Per Truant 2000-01



Statistical Measures of District Costs

Figure 2 presents our calculations of various statistical measures relating to claims filed under the habitual truant program. It shows:

- The unweighted average cost per truant -- that is, the “average of averages” for all districts -- was \$49 in 2000-01 and \$58 in 2001-02.
- The median -- that is, the level at which half the districts reported higher and the other half reported lower claims per truant -- was about \$36 in 2000-01 and \$39 in 2001-02².
- The weighted average -- which takes into account the number of truants in each district -- was \$25 in 2000-01 and \$28 in 2001-02³.

² The higher average relative to the median is a manifestation of the skewed nature of the distributions, where the relatively few districts at the top end with extremely high claims raise the average more than the median (which is largely unaffected by outliers). Another indication of the skewed distribution is found by looking at the average variance around the mid-point. In 2000-01, the average variation on the high side of the median is about \$46, while the average variation on the low side is just \$20. This calculation is based on a log transformation of the distribution, which results in a normal distribution of the transformed variables from which a standard deviation can be calculated.

³ The weighted average can also be calculated by simply dividing the statewide total amount of claims by the statewide total amount of habitual truants in districts making claims under the program.

- The average for mid-sized districts -- defined as districts between the 40th and 60th percentiles -- was about \$44 per truant in 2000-01 and about \$47 per truant in 2001-02.

Figure 2
Costs Per Truant: All Districts

	2000-01	2001-02
Unweighted Average	\$48.60	\$57.93
Median	\$35.92	\$38.99
Weighted Average*	\$25.46	\$27.54
Average of Mid-sized District **	\$44.25	\$47.02

*based on # of truants in districts

** Defined as the 40th to 60th percentile

Unweighted Versus Weighted Averages

The weighted and unweighted averages measure two related, though distinct, concepts. The unweighted average represents the expected value of claims per truant submitted by a randomly selected district -- regardless of the district's size. The weighted average represents the expected value of any claim randomly selected in a year. This measure will be heavily influenced by the results from large districts, simply because they account for the vast majority of claims. For example, the top 1 percent of districts (just 6 districts in 2000-01) account for over 41 percent of total claim amounts, and the top 20 percent of districts account for about 85 percent of the total claims.

The dominance of larger districts has a major impact on the weighted averages in cases where their costs are tend to be higher or lower than their smaller counterparts. This is clearly the case for the HTP, where a strong inverse relationship exists between district size (as measured here according to the number of truancies) and average cost.

This relationship is displayed in Figure 3 and Figure 4, which show, for example, that the smallest 20 percent of districts (that account for less than 0.5 percent of all truants) reported average costs per truant of \$70 in 2000-01 and close to \$80 in 2001-02. At the other extreme, the largest 1 percent of districts (which account for over 41 percent of total truants) had average costs of about \$13 in 2000-01 and \$15 in 2001-02.

Figure 3
Average Cost by District Size

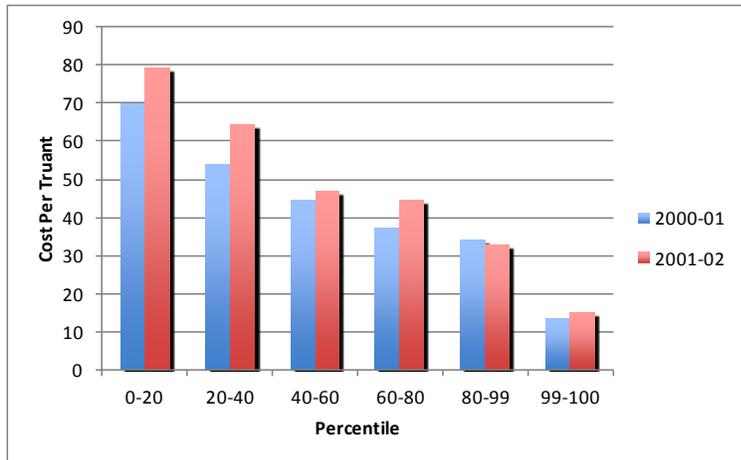


Figure 4
Average Costs and Shares of Total Truants, by District Size

Size of District	2000-01		2001-02	
	Cost per Truant	Share of Total Truants	Cost per Truant	Share of Total Truants
Smallest 20%	\$70.08	0.3%	\$79.33	0.5%
20 to 40 percentile	\$53.91	1.1%	64.40	1.7%
40 to 60 percentile	\$44.26	3.3%	47.02	4.2%
60 to 80 percentile	\$37.28	9.6%	44.59	10.7%
80 to 99 percentile	\$32.97	44.6%	32.76	38.0%
Top 1 percentile	\$13.07	41.2%	14.77	44.9%

The inverse relationship between district size and average cost per truant may reflect economies of scale in larger districts, which are more likely to have automated reporting and notification capabilities than smaller districts. With additional experience, larger districts have the opportunity to develop more routine and efficient processes for identifying habitual truants, making contacts with parents or guardians, conducting conferences, and accurately assessing costs for the various reimbursable activities.

The relationship between district size and unit costs has two key implications for our analysis. First, it suggests that a significant portion of the overall variation in claims is not random, but rather reflects an arguably rational difference in unit costs from district to district, relating to their size. Second, it implies that, despite large variation in the overall sample, weighted average cost figures will likely remain stable over time if the variability in costs is moderate among the large districts (which have the dominant effect on the weighted averages). This was indeed the case for the period we studied. For example, the

standard deviation in unit costs for the 10 largest districts was only \$5 in 2000-01. Similarly, the correlation of unit costs for individual districts between 2000-01 and 2001-02 was .76 for the ten largest districts – considerably higher than the .3 for all districts making claims in each of the two years⁴.

Elimination of Outliers

To provide an indication of the sensitivity of the unit cost calculations to the elimination of outliers, Figure 5 displays the effects of eliminating the highest and lowest observations from our analysis. Not surprisingly, elimination of just the highest 10 percent of districts reduces both weighted and unweighted costs. If we eliminate both the top and bottom 10 percent of districts, the effects are mixed: the unweighted averages fall modestly but the weighted average increase significantly. A key reason for the increase in weighted costs is that larger districts tend to have the lowest costs, and thus carry the highest weights. Thus, elimination of a typical low-cost district will have a greater impact on the weighted average than the elimination of a typical high cost district, all else being equal.

Figure 5
Effects of Eliminating Outliers

	2000-01	2001-02
All Districts:		
Unweighted Average	\$48.60	\$57.93
Weighted Average	\$25.46	\$27.54
Eliminate:		
Top 10% of districts		
Unweighted Average	\$37.11	\$45.70
Weighted Average	\$23.07	\$24.63
Top and bottom 10% of districts		
Unweighted Average	\$40.72	\$46.30
Weighted Average	\$32.21	\$34.44
Observations > 2 standard deviations from predicted value ^a		
Unweighted Average	\$36.34	\$40.39
Weighted Average	\$23.33	\$25.38

a\ Predicted value based on regression-based relationship between average cost and size of district.

⁴ Our analysis specifically measured the Pearson Correlation Coefficient of the claims data for the two years – a measure of the linear dependence between two variables. The coefficient is derived by dividing the covariance of the two variables by the product of their variances. Strong correlation is generally considered to be a value of between .5 and 1, moderate correlation is generally considered to be a value of from .3 to .5, and weak correlation is considered to be in the range of from .1 to .3.

Although the elimination of the highest and lowest unit cost rates provides a reasonable indication of the sensitivity of the averages to the elimination of extreme observations, there are risks in eliminating outliers in statistical analysis. Other than extreme cases that are clearly related to input errors or other anomalies, any decision regarding the criteria or methodology for excluding observations has the potential to bias the results. For example, when there is a strong inverse correlation between average costs and district size (such as is present in the HTP), a methodology that arbitrarily drops high and low claims without regard to district size runs the risk of eliminating from consideration a large district that reports a unit cost that, while appearing low relative to overall averages, is in fact reasonable for a district of its size. As similar risk of unwarranted elimination exists for smaller districts that report high costs for legitimate reasons.

In order to address this potential bias, we used a methodology that looks at variation of each district from its expected value given its size. To do this, we first developed a regression-based equation relating the average claim per truants to district size (as measured by numbers of truants). We then calculated the standard deviation from the regression line, and eliminated observations more than two standard deviations from their expected values given their relative size.⁵ This resulted in the elimination of about 5 percent of the observations for each year. As indicated in Figure 5, the elimination of these observations resulted in a modest decline in the weighted unit cost amount to \$23.33 in 2000-01 and \$25.38 in 2001-02. The results indicate that the elimination of outliers, after taking into account differences in district size, has a fairly modest impact on the weighted average cost. This would imply that the weighted average using all available data (with the exception of the anomalous districts in the 2001-02 claims data) is a reasonable measure of for a single unit cost method.

Adjustments For Inflation

Over the decade from 2001 to 2011, the U.S. Implicit Price Deflator for state and local governments has increased by about 44 percent. If it is assumed that district costs have grown roughly in line with this change in general inflation, the equivalent RRM in 2011 dollars would be about \$36.

Conclusion

We believe that a RRM of about \$26 is reasonable for the period we examined. This amount is slightly lower than the weighted averages for the two years combined, but slightly higher than the amount resulting from the elimination of outliers using the regression-based technique we describe above. If adjusted for inflation, the \$26 rate would rise to \$37 in

⁵ The specific estimated equation for 2000-01, in log form, is $Y_i = 4.39 - .18X_i$, where Y_i is average cost per truant in district i and X_i is the number of truants in district i .

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2011. This unit cost is based on a methodology that weights unit costs according to the number of truants in each district. We believe this approach yields a reliable estimate. This is because the larger districts that dominate the weighted averages have low and stable costs during the two years that we reviewed.