

**An Alternative to the Principal Person Method for Weighting  
in the American Community Survey**

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**Introduction**

The American Community Survey (ACS) is a monthly survey conducted by the Census Bureau that collects demographic and socioeconomic data about households and persons and is intended to replace the decennial census long form. Testing of the ACS began in 1996, and is now in 36 counties. In 2000, an additional 1,201 counties were added in what was known as the supplementary sample. The ACS instrument and data collection methods were used in these counties, but using a much smaller sampling rate than in the 36 counties. National and state level ACS estimates published by the Census Bureau are produced using the data from the 36 counties and the supplementary sample. The ACS is scheduled for full implementation in every county in the United States beginning in January of 2005.

An issue of considerable concern about the ACS estimates is that the estimates of occupied housing units do not equal the estimate of householders. The householder is also referred to as the reference person. He/she is the person who is listed first on the questionnaire, and is the person living or staying in the housing unit in whose name it is owned or being rented. If there is no such person, the householder can be any adult living or staying there (1).

The differences described in the previous paragraph are due to the weighting methodology that the ACS uses for weighting housing units, which is known as the principal person method. A working group was formed at the Census Bureau to investigate possible ways to correct this discrepancy (Love 2003). One alternative that is being considering is the weighting method used by the New York City Housing Vacancy Survey (NYCHVS). This method will produce estimates of householders that agree with the estimates of households and occupied housing

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units. It will also produce estimates of married women and men that agree when the universe is restricted to housing units where both a husband and wife reside. This paper examines the effect of the NYCHVS weighting on other ACS housing unit and population estimates.

**Methodology**

Current Weighting Methodology

The current method of weighting uses what is known as the principal person method (Alexander 1987). It is implemented as follows:

- After noninterview adjustments, the HU weights are adjusted to agree with independent HU control totals. These weights are then assigned to each person in the HU to obtain person weights.
- The person weights are then adjusted to agree with independent population controls by race, age, and sex. There are 6 race groups and 26 age/sex groups (156 total cells). Collapsing of these cells is done to ensure that each cell has at least 10 sample persons.
- The HU is then assigned the weight of the principal person, which is defined to be the female spouse of the householder or the householder if no female spouse exists.
- The HU weights are then adjusted again to make the total HU estimate agree with the independent controls.

NYCHVS Methodology

Estimates of householders and occupied HUs are made equal by a different method of post-stratification:

- We begin with the same HU weights that are computed with the current methodology as described in the first bullet of the previous section. But then the weights of the

householder and spouse/ unmarried partner of the householder are not adjusted (for convenience, these three categories of people will be called reference persons). Post-stratification adjustments are only made to persons who have a different relationship to the householder. The weights of these remaining persons are adjusted to the difference between the population control and the estimate of reference persons.

- No further adjustments to HU weights are made.

Under this method, the total population will still be controlled. Also, all estimates of occupied HU characteristics will be the same regardless of whether the HU weight or householder weight is used since they are the same.

Use of this method often required further collapsing of race/age/sex cells. Most of this additional collapsing is of age/sex cells within race. It was relatively uncommon to further collapse across race. There are three situations where further collapsing was required:

- The adjustment factor is negative. This happens when the estimate of reference persons is larger than the population control. It turned out to be a fairly common situation.
- Everyone in a cell is a reference person. Thus no one in the cell would get an adjustment and the population estimate of the cell would not be controlled.
- The adjustment factor is too large or too small, violating maximum/minimum weight rules. This will happen more often than under the current weighting method.

The three situations described above will cause more collapsing than under the current method. In some sites there will be only a small amount of additional collapsing, but in other sites the opposite will be true. For example, Bronx Borough, NY required relatively little additional collapsing. At the other extreme is Vilas County, WI, which required nearly all the age/sex groups to be collapsed. This additional collapsing creates the potential for estimates of

population characteristics, and their variances, to be seriously affected.

#### Variance Estimation

Fay's method of replicate weighting (Fay 1989) is used for variance estimation in the ACS, using the same basic approach outlined by Dippo, Fay, and Morganstein (1984). It is also used in other surveys the Census Bureau conducts, including the Current Population Survey and the Survey of Income and Program Participation. For each sample case, 80 replicate weights are computed. These replicate weights are then used to compute 80 replicate estimates of a given characteristic. For a characteristic X, the estimated variance is given by:

$$Var(X) = \frac{4}{80} \sum_{i=1}^{80} (X_i - X)^2$$

where  $X_i$  is the estimate based on the  $i$ th replicate sample.

#### Comparisons

We reweighted the 2002 ACS data using the NYCHVS methodology. Estimates and their variances were then compared to those that were obtained with the current methodology. In this paper, we focus on estimates for relationship to householder, age, marital status, and race.

We compared estimated totals for characteristics by examining the changes in the estimated totals and the changes in the characteristic's percentage of the population distribution (i.e. percent white, percent black, etc). For a given characteristic, the null hypothesis was that there is no difference in estimates produced by the two weighting methods. The test statistic was the difference between the two estimates. The variance of this difference was estimated with the variance formula given in the previous section. The replicate estimates for the difference are given by  $D_i = X_{Ni} - X_{Oi}$ ,  $i=1,2...80$ , where  $X_{Ni}$  and  $X_{Oi}$  are the  $i$ <sup>th</sup> replicate estimates from the NYCHVS weighting method and the original weighting respectively. Significance testing for differences was then done using Bonferonni's method at an overall significance level of 0.10. For example, when testing for differences in estimates for race

(seven categories), each category was tested at the 0.0071 level.

We looked at the estimated coefficients of variation (CV) to compare the variability of estimated totals produced by the two weighting methods. The CV is defined as the square root of the variance divided by the estimate. We decided to compare CVs because estimates produced by the two methods can be significantly different which would affect the relative sizes of the variances. We did not perform any significance testing on the difference in CVs, but rather used our own subjective standards. Generally, we consider a difference of three or more percentage points to be large.

## Results

We made the decision not to implement the NYCHVS methodology at this time because it would significantly affect the estimates and distributions of important demographic characteristics and cause variance estimates to increase. The increase in variance estimates is the largest reason for our decision, although changes in the estimated totals for characteristics also played a role.

The characteristics that were most affected by the NYCHVS method were relationship to householder, age, marital status, and race. This was expected since these variables are the ones that are most related to weighting. The results described in this section will focus on those characteristics.

### Effect on Distributions

Tables 2 through 5 (in the appendix) show the national level distributions for relationship, age, marital status, and race. They also show the percentage change in the estimated totals. The percentage change is defined as  $100 * (X_N - X_O) / X_O$ , where  $X_N$  is the estimated total with the NYCHVS weighting and  $X_O$  is the original estimated total. The last two columns in Tables 2 through 5 show whether the difference in the estimated totals was significant and the number of states where there was a significant difference. Tables 2a through 5a (in the appendix) show quantiles for the percentage changes for estimated totals at the state level. For example, consider the relationship category 'Child.' Table 2a shows the percentage change in the state level estimates range from -5.07% to 11.94%, with a median percentage change of 3.09%.

Table 2 shows the distributions for Relationship. This was the characteristic whose distribution was most affected by using the NYCHVS weighting method. The difference in estimates for each category was significant at the national level and in a large number of states. Estimates of reference persons are lower under the NYCHVS method. Most of the post-stratification factors were greater than 1.0 under the current weighting methodology. But in the NYCHVS method, weights for these persons are equal to the HU weight (post-stratification factor set to 1.0). Persons in the other relationship categories absorb the differences since we are still controlling the population estimates. So in general, the estimates for householders, spouses, and unmarried partners are lower, while estimates for children, other family, and nonfamily members are higher. This pattern can be seen in the percentage changes in state level estimates shown in Table 2a.

Distributions for age categories are shown in Table 3. State level percentage changes are shown in Table 3a. There were significant differences in the national level estimates for seven of the 13 age groups. The age groups 25-34, 35-44, and 65-74 were most affected. However, the age group 15-19 was the one with the largest number of states showing a significant difference.

Distributions for marital status are shown in Table 4. State level percentage changes are shown in Table 4a. Marital status was analyzed separately for males and females. Estimates for males were affected more than they were for females. For males, there was a significant difference in national level estimates for every category except widowed. And a large number of states had significant differences in the married, never married, and divorced categories. For females, only the married and widowed categories had significantly different estimates at the national level. There were very few significant differences at the state level except for the married category. In addition, the estimates for married males and married females are much closer to each other when using the NYCHVS method. Differences in these estimates are due to housing units in which a married person does not reside with their spouse, or when a husband and wife reside together but neither one is the householder.

Distributions for race are shown in Table 5. State level percentage changes are shown in Table 5a. Race was divided into seven categories: six single-race categories and a multiple race category (two or more). Only the

black and multiple race categories showed a significant difference in national level estimates. Estimates for the minority race groups were generally more affected than for whites. This is especially apparent in Table 5a, which shows a wide range of percentage changes in state level estimates for minorities, but only a small range of changes for whites.

Even though differences in national and state level estimates for a characteristic may not be significant, there can be very large differences at lower levels of geography. One example of this is in Ventura County, California. In this county the estimate of Blacks is about 50 percent lower using the NYCHVS weighting method. But there was relatively little change in the distribution of race for California as a whole. The table below shows the distribution for race in Ventura County under each method.

Race	Current Estimate	NYCHVS Method
White	597,681	599,080
Black	8,515	4,209
AIAN <sup>1</sup>	4,468	4,128
Asian	42,499	47,103
NHOPI <sup>2</sup>	1,301	1,262
Some other race	79,960	78,918
Two or more races	36,234	35,958

<sup>1</sup>American Indian/Alaska Native

<sup>2</sup>Native Hawaiian/Other Pacific Islander

Another example can be seen in Vilas County, Wisconsin. The distribution for age was seriously affected. Estimates were much lower for younger age groups much higher for older age groups using the NYCHVS method. The table below shows the distribution for age in Vilas County under each method.

Age	Current Estimate	NYCHVS Method
Under 5	640	850
5 to 9	719	352
10 to 14	1500	635
15 to 19	1099	606
20 to 24	505	241
25 to 34	2314	2,022
35 to 44	3081	3,147
45 to 54	3349	2,784
55 to 59	1627	2,047
60 to 64	1729	2,175
65 to 74	2719	3,531
75 to 84	1923	2,753
85 and over	137	199

Effect on Variances

The NYCHVS weighting method produced unacceptable increases in the variances of estimates for many characteristics. The coefficient of variation (CV), expressed as a percentage, was used to compare the variances. There were many estimates where estimated CVs increased by as much as three percentage points or more. There were also cases where the CV under the NYCHVS method is actually lower. Differences between the CV estimates produced by each weighting method are shown in Tables 6a through 6d. These tables show the CV increases, in percentage points, for the state level estimates in each of the categories for the characteristics age, relationship to householder, marital status, and race. The increase is defined as the difference between the new CV estimate and the original CV estimate. For example, consider the 20-24 age group. Table 6b shows that the CV estimate increased by at least two percentage points in 25 percent of the states, with the largest increase being 7.29 percentage points. These four characteristics are where large increases in the estimated CVs were most common. With other characteristics, the increases in the CVs were mostly small with only a few large increases.

Increases in estimated CVs for relationship categories are shown in Table 6a. CVs for householder estimates were least affected while those for ‘other relatives’ and nonrelatives were most affected.

Table 6b shows the estimated CV increases for age. The age groups that were most affected overall were the older groups 65-74, 75-84, and 85+. The least affected groups were 0-5, 5-9, and 10-14 where nearly all states had estimated CVs increase less than one percentage point.

Table 6c shows estimated CV increases for marital status estimates among males and females. There was little overall difference in estimated CV increases between males and females. The ‘married’ category was least affected. Although as seen in the previous section, the estimated totals were greatly affected.

Table 6d shows the estimated CV increases by race. Whites were least affected, where increases in most states were less than one percentage point and only one state’s increase was greater than two. But there were many large increases among minority racial categories, some being more than 10 percentage points. This is especially discouraging because variances for minority estimates tend to be larger than those

for whites to begin with, and this gap is being made wider.

**Conclusions and Further Research**

We decided not to implement the NYCHVS weighting method at this time because the effects on distributions and variances described in the previous section are unacceptable to us. We plan to revisit this research after the ACS is fully implemented, assuming that we do not develop another solution. We will have a much larger sample with full implementation, which may produce more favorable results. This will be in 2006, when we will have the 2005 data to work with.

There were other alternatives proposed by the working group mentioned in the introduction of this paper. We will continue to explore these alternatives to eliminate or mitigate the problem.

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**Appendix**

**Table 2. National Level Distributions for Relationship (Overall  $\alpha=0.10$ , Bonferonni  $\alpha=0.01$ )**

Relationship	Current Estimate	Percent of Dist.	NYCHVS Method	Percent of Dist.	Percentage Increase	Significant Difference	States with Sig. Diff.
Householder	111,019,533	39.6%	107,034,980	38.2%	-2.21%	Yes	33
Spouse	56,245,791	20.0%	54,453,546	19.4%	-2.63%	Yes	23
Child	83,343,016	29.7%	85,963,808	30.6%	3.46%	Yes	27
Other relatives	16,473,514	5.9%	18,761,102	6.7%	4.88%	Yes	16
Nonrelatives	13,458,476	4.8%	14,326,894	5.1%	4.61%	Yes	13
Unmarried partner <sup>1</sup>	5,465,733	40.6%	5,112,593	35.7%	-6.46%	Yes	36

<sup>1</sup>Unmarried partner is also included in the Nonrelatives category. Significance tests for this category were at the 0.10 level.

**Table 2a. Quantiles of Percentage Changes in State Level Relationship Estimates**

Relationship	Min	5th	10th	25th	50th	75th	90th	95th	Max
Householder	-9.73	-6.35	-5.17	-4.15	-3.08	-2.03	-1.05	-0.37	1.80
Spouse	-8.81	-5.87	-5.36	-4.14	-2.83	-1.92	-1.10	0.48	2.05
Child	-5.07	-0.29	0.67	1.75	3.09	4.38	6.06	8.26	11.94
Other Relatives	-1.75	4.66	5.32	8.56	13.65	17.11	22.44	24.72	43.15
Nonrelatives	-3.48	-1.24	0.59	3.20	6.37	8.94	11.39	13.38	19.67
Unmarried Partner	-14.76	-11.78	-10.63	-8.38	-6.38	-3.87	-0.34	-0.20	0.34

**Table 3. National Level Distributions for Age  
(Overall  $\alpha=0.10$ , Bonferonni  $\alpha=0.0038$ )**

Age	Current Estimate	Percent of Dist.	NYCHVS Method	Percent of Dist.	Percentage Increase	Significant Difference	States with Sig. Diff.
Under 5	19,526,670	7.0%	19,605,590	7.0%	0.40%	Yes	2
5 to 9	19,874,923	7.1%	19,917,826	7.1%	0.22%	No	5
10 to 14	21,090,854	7.5%	21,112,478	7.5%	0.10%	No	7
15 to 19	18,750,668	6.7%	19,014,687	6.8%	1.41%	Yes	12
20 to 24	18,610,949	6.6%	18,356,125	6.5%	-1.37%	No	5
25 to 34	38,742,608	13.8%	38,146,658	13.6%	-1.54%	Yes	5
35 to 44	44,266,171	15.8%	43,494,027	15.5%	-1.74%	Yes	8
45 to 54	39,733,607	14.2%	39,934,297	14.2%	0.51%	No	1
55 to 59	14,865,650	5.3%	14,941,734	5.3%	0.51%	No	1
60 to 64	11,488,377	4.1%	11,557,983	4.1%	0.61%	No	1
65 to 74	17,961,629	6.4%	18,420,286	6.6%	2.55%	Yes	2
75 to 84	12,189,823	4.3%	12,479,060	4.4%	2.37%	Yes	3
85 and over	3,438,401	1.2%	3,559,579	1.3%	3.52%	Yes	0

**Table 3a. Quantiles of Percentage Changes in State Level Age Estimates**

Age	Min	5th	10th	25th	50th	75th	90th	95th	Max
Under 5	-1.84	-0.74	-0.37	-0.04	0.37	0.71	1.19	1.45	2.66
5 to 9	-4.41	-3.32	-1.41	-0.26	0.44	1.11	2.52	3.52	7.07
10 to 14	-7.17	-3.30	-1.46	-0.20	0.29	0.80	2.03	2.40	7.69
15 to 19	-10.65	-6.78	-1.75	-0.50	1.56	4.45	5.77	8.38	26.71
20 to 24	-8.32	-7.27	-6.41	-4.44	-1.20	0.85	4.35	6.45	10.75
25 to 34	-8.12	-6.13	-5.39	-3.92	-2.26	-0.29	1.87	3.39	4.42
35 to 44	-6.36	-5.48	-5.16	-3.40	-1.78	0.07	1.56	2.59	2.93
45 to 54	-6.30	-2.49	-2.05	-0.98	-0.05	1.44	2.79	3.32	8.51
55 to 59	-8.76	-5.14	-2.38	-0.71	0.83	2.76	4.09	4.77	11.38
60 to 64	-6.01	-5.21	-2.78	-1.14	0.77	2.99	4.03	5.44	10.00
65 to 74	-4.24	-2.14	-1.61	0.87	2.75	4.63	8.77	9.35	14.83
75 to 84	-7.37	-2.73	-1.86	-0.19	2.30	3.83	6.43	7.49	14.29
85 and over	-15.30	-5.31	-2.32	1.67	3.47	6.21	9.17	10.63	12.65

**Table 4. National Level Distributions for Marital Status  
(Overall  $\alpha=0.10$ , Bonferonni  $\alpha=0.01$ )**

Marital Status	Current Estimate	Percent of Dist.	NYCHVS Method	Percent of Dist.	Percentage Increase	Significant Difference	States with Sig. Diff.
<b>Males</b>							
Never married	31,947,159	30.1%	33,280,989	31.4%	4.18%	Yes	27
Married <sup>1</sup>	60,392,481	56.9%	58,555,803	55.2%	-3.04%	Yes	27
Separated	1,895,600	1.8%	1,991,090	1.9%	5.03%	Yes	1
Widowed	2,579,299	2.4%	2,692,938	2.5%	4.40%	No	2
Divorced	9,288,132	8.8%	9,636,205	9.1%	3.74%	Yes	0
<b>Females</b>							
Never married	27,872,375	24.5%	28,232,329	24.8%	1.29%	No	7
Married <sup>1</sup>	59,026,540	51.8%	57,962,903	51.0%	-1.80%	Yes	19
Separated	3,058,428	2.7%	3,075,768	2.7%	0.57%	No	0
Widowed	11,149,354	9.8%	11,503,625	10.1%	3.18%	Yes	3
Divorced	12,838,515	11.3%	12,972,786	11.4%	1.05%	No	0

<sup>1</sup>Excludes separated

**Table 4a. Quantiles of Percentage Changes in State Level Marital Status Estimates**

Marital Status	Min	5th	10th	25th	50th	75th	90th	95th	Max
<b>Males</b>									
Married	-6.91	-6.00	-5.58	-4.05	-3.17	-1.59	-0.75	-0.29	1.55
Widowed	-5.70	-2.68	-2.47	2.20	4.33	8.40	9.66	10.62	15.03
Divorced	-0.90	0.28	1.05	1.96	3.72	5.79	7.54	8.80	9.48
Separated	-9.43	-5.39	-4.58	0.63	4.65	8.42	12.59	16.92	17.67
Never Married	-5.62	-0.55	-0.21	2.43	4.35	6.54	7.84	10.82	14.79
<b>Females</b>									
Married	-5.96	-4.48	-3.90	-2.49	-1.89	-1.17	0.04	1.12	4.16
Widowed	-5.88	-1.42	-0.55	1.18	2.63	4.06	6.55	7.06	11.92
Divorced	-4.27	-2.56	-1.39	-0.26	0.79	1.62	3.58	5.19	6.26
Separated	-14.36	-7.35	-4.66	-2.23	0.49	3.85	5.61	8.32	11.86
Never Married	-8.72	-6.08	-5.17	-0.78	1.80	3.43	4.36	7.71	9.34

**Table 5. National Level Distributions for Race (Overall  $\alpha=0.10$ , Bonferonni  $\alpha=0.0071$ )**

Race	Current Estimate	Percent of Dist.	NYCHVS Method	Percent of Dist.	Percentage Increase	Significant Difference	States with Sig. Diff.
White	212,541,793	77.6%	212,493,286	77.6%	-0.02%	No	4
Black	33,768,036	12.3%	33,220,012	12.1%	-1.62%	Yes	9
AIAN	1,959,347	0.7%	2,143,515	0.8%	9.40%	No	6
Asian	11,213,133	4.1%	11,265,372	4.1%	0.47%	No	3
NHOPI	365,474	0.1%	373,308	0.1%	2.14%	No	1
Some other race	14,187,100	5.2%	14,314,203	5.2%	0.90%	No	1
Two or more races	6,505,447	2.3%	6,730,634	2.4%	3.46%	Yes	5

**Table 5a. Quantiles of Percentage Changes in State Level Race Estimates**

Race	Min	5th	10th	25th	50th	75th	90th	95th	Max
White	-4.07	-1.23	-0.54	-0.16	0.01	0.13	0.35	0.54	1.54
Black	-26.62	-10.82	-7.00	-3.98	-0.93	0.62	3.31	8.91	37.31
AIAN	-27.18	-12.20	-8.97	-1.24	7.71	19.29	46.96	65.04	90.53
Asian	-13.12	-11.03	-9.90	-2.00	0.57	6.63	14.99	19.67	29.17
NHOPI	-53.96	-36.71	-28.16	-11.47	0.00	8.96	19.19	69.75	143.85
Some other race	-13.38	-5.50	-4.68	-1.50	0.65	4.97	14.58	16.48	35.34
Two or more races	-13.22	-4.55	-2.64	-0.36	2.55	7.08	17.47	25.28	58.17

**Table 6a. Quantiles of Increases in State Level Coefficient of Variation Estimates**

Relationship	Min	5th	10th	25th	50th	75th	90th	95th	Max
Householder	-0.68	-0.29	-0.19	-0.07	0.08	0.36	0.79	1.42	2.86
Spouse	-0.20	0.03	0.12	0.28	0.53	0.82	1.39	2.21	3.65
Child	0.11	0.20	0.24	0.34	0.58	0.86	1.55	2.03	5.67
Other Relatives	-0.66	-0.15	0.09	0.51	1.70	4.04	7.55	8.51	12.39
Nonrelatives	-2.68	-0.44	-0.04	0.19	0.58	1.28	3.11	5.14	7.98
Unmarried Partner	-1.65	-0.80	-0.36	-0.22	0.24	0.44	1.30	1.67	3.92

**Table 6b. Quantiles of Increases in State Level Coefficient of Variation Estimates**

Age	Min	5th	10th	25th	50th	75th	90th	95th	Max
Under 5	-0.43	-0.16	-0.12	-0.06	0.06	0.23	0.47	0.69	1.53
5 to 9	-0.31	-0.11	-0.05	0.02	0.08	0.19	0.53	0.77	3.09
10 to 14	-0.37	-0.12	-0.10	0.01	0.08	0.22	0.71	0.76	0.91
15 to 19	-0.33	-0.00	0.17	0.40	0.57	1.11	1.79	2.89	9.81
20 to 24	-0.35	0.09	0.41	0.79	1.21	2.03	5.37	6.51	7.29
25 to 34	0.27	0.57	0.62	0.80	1.42	2.13	2.57	2.67	4.09
35 to 44	0.44	0.52	0.60	0.90	1.34	1.91	2.33	2.54	2.91
45 to 54	0.39	0.62	0.82	1.13	1.44	2.01	2.55	3.02	3.16
55 to 59	-0.10	0.26	0.36	0.71	1.09	1.62	2.18	2.49	2.97
60 to 64	-0.91	-0.13	0.10	0.45	0.98	1.50	2.14	2.40	5.04
65 to 74	0.57	1.01	1.34	1.61	2.58	3.67	5.35	5.62	10.21
75 to 84	-2.44	0.56	0.68	0.94	1.58	3.20	3.86	6.40	8.79
85 and over	-2.42	0.02	0.15	0.61	1.50	3.07	5.66	12.78	20.81

**Table 6c. Quantiles of Increases in State Level Coefficient of Variation Estimates**

Marital Status	Min	5th	10th	25th	50th	75th	90th	95th	Max
Males									
Never married	-1.02	-0.09	0.00	0.16	0.42	0.85	1.69	1.99	5.79
Married	-0.28	-0.08	0.04	0.20	0.35	0.63	1.03	1.93	3.20
Separated	-4.18	-0.77	0.06	0.86	1.56	2.99	4.21	5.06	11.55
Widowed	-0.64	0.31	0.37	0.82	1.59	2.58	4.25	6.00	16.48
Divorced	-0.62	-0.18	0.08	0.34	0.75	1.11	2.22	3.40	4.86
Females									
Never married	-0.21	0.04	0.13	0.35	0.67	1.48	2.68	3.76	9.87
Married	-0.30	-0.09	0.04	0.11	0.26	0.46	0.94	2.06	3.03
Separated	-2.03	-1.31	-0.66	0.23	0.72	1.77	3.11	3.67	5.52
Widowed	-0.05	0.28	0.34	0.68	1.19	2.24	4.19	6.76	11.41
Divorced	-1.82	-0.22	-0.08	0.24	0.65	0.89	1.34	1.94	5.34

**Table 6d. Quantiles of Increases in State Level Coefficient of Variation Estimates**

Race	Min	5th	10th	25th	50th	75th	90th	95th	Max
White	-0.02	0.00	0.02	0.06	0.20	0.30	0.56	0.70	2.89
Black	-7.27	-1.03	0.00	0.20	0.98	1.80	4.44	5.89	15.11
AIAN	-11.39	-5.51	-2.96	-0.94	1.51	5.18	10.93	12.50	51.22
Asian	-6.64	-0.49	0.13	0.46	1.30	3.10	7.43	11.01	15.62
NHOPI	-48.93	-7.30	-4.40	-0.11	1.60	4.96	16.57	26.20	45.23
Some other race	-1.19	-0.90	-0.70	0.12	0.99	2.59	4.96	7.65	13.19
Two or more races	-1.05	-0.60	-0.36	-0.01	0.56	1.47	2.49	5.54	9.68