Implementation of Improvements to the Allocation Routine for Health Insurance Coverage in the CPS ASEC

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Introduction

The Annual Social and Economic Supplement to the Current Population Survey (CPS ASEC) provides over twenty years of state and national level health insurance coverage estimates. Due to the long time series and state representative sample, the CPS ASEC is a critical data source for surveillance and policy analysis of national and state-level health insurance coverage dynamics (Blewett et al., 2004).

Over time, the U.S. Census Bureau has made several methodological improvements to the CPS ASEC. These changes were undertaken with the desire to improve the accuracy of the estimates while balancing the consistency of the time series. In 2011, the Census Bureau implemented the latest quality improvement and revised the time series from 2000 to 2010 supplanting a previously revised series that was released in 2007.

This paper describes the 2011 improvement to the allocation routine for health insurance coverage and all data processing adjustments that have occurred since 2000 and were incorporated into the new revised time series. We expand on earlier work that showed the impact of these changes on health insurance coverage estimates in the 2009 CPS ASEC (Boudreaux and Turner, 2011) by examining the time series spanning from 1988 to 2011 using three sources of CPS ASEC data: a legacy file, the 2011 revisions, and a file that has been edited and reweighted to improve the consistency of the time series over important periods of measurement change.

CPS ASEC Overview

The CPS is a monthly labor force survey conducted by the Census Bureau on behalf of the Bureau of Labor Statistics. The ASEC supplement is administered in February through April and asks additional questions on work, income, migration, and health insurance coverage. The CPS ASEC is based on a complex area probability sample and is representative of the civilian non-institutionalized population of the 50 states and the District of Columbia. About 100,000 addresses are sampled each year.

Questions on health insurance coverage have been asked in the same general format since 1988. The instrument gathers information on the presence, type, and characteristics of coverage held during the previous calendar year. For example, the 2011 ASEC (survey year) asks about health insurance coverage in 2010 (calendar year). Information is obtained for each member of the household.

Historical Modifications

Several changes have been made to the health insurance questions and processing routines since the CPS ASEC began asking about this topic. The changes were motivated by recommendations from technical advisory groups to improve known limitations of the instrument and to correct identified errors. All changes were evaluated by the Census Bureau prior to implementation either through field testing of question modifications or detailed analysis of the impacts of processing improvements. In this paper we focus on changes from 2000 forward (the years of the revised time series).

Exhibit 1 describes the historical modifications to the CPS ASEC that have been incorporated into the revised time series. We discuss the changes that were incorporated into the revised series including the latest quality improvement, a change to the allocation routine.

Exhibit 1. Historical Modifications to the CPS ASEC

CPS ASEC Year	Historical Modifications
2000	Health insurance verification question introduced.
2001	Separate CHIP question added.
2005-2006	Correction to the assignment of private coverage. For 1997-2004 an approximation was introduced for the assignment of private coverage.
2010	Medicaid assigned to uninsured foster children.
2011	Improvements to missing data allocation and coding correction for allocated values of directly purchased dependent coverage.

2000

Prior to 2000, those without coverage were identified using a residual method – those who did not indicate any type of coverage were considered to be uninsured. In 2000, the questionnaire was amended with a verification question that specifically asked respondents who had not reported any type of health insurance coverage if they were in fact uninsured. This change resulted in a reduction of the uninsured rate by about 1.2 percentage points (Nelson and Mills, 2001). The addition of the verification question results in a break in the series and is why the 2011 revisions were made from 2000 forward.

2001

A question was added about Children's Health Insurance Coverage (CHIP) in 2001. In the first year, a small number of "yes" responses were not coded as having Medicaid coverage. This was corrected in 2002 and retroactively applied to 2001 in fall 2011.

2005-2006

A correction to the assignment of private coverage was made in 2005-2006 and retroactively applied to the 2000 to 2004 CPS ASECs in fall 2011. During process improvements the Census Bureau discovered that if a respondent reported that someone in the household had employment-based or direct purchase coverage and then reported "all" household members were covered under that health insurance policy, the editing procedure recorded coverage for the other household members as missing. During the allocation process a small number of cases were allocated to uninsured when in fact they had private coverage. The correction reduced the uninsured rate by 0.6 percentage points in survey year 2006. Lee and Stern (2007) provide more details on this correction.

When the 2005-2006 correction to the assignment of private coverage was originally implemented the Census Bureau did not have the resources to re-run all affected years of data and instead released an approximation for 1997-2004 to be used with the public use data. With the revised time series released in fall 2011 the actual correction was implemented for 2000 to 2004 and the approximation is no longer needed for 2000 forward. However, for 1997 to 1999 the approximation will still be needed. More information is available at http://www.census.gov/hhes/www/hlthins/data/usernote/index.html.

2010

Medicaid coverage was assigned to all uninsured foster children beginning in 2010 and retroactively applied to the 2000 to 2009 CPS ASECs in fall 2011. This change was implemented to reflect the fact that all foster children are a mandatory coverage group under Medicaid.

2011

An improvement to the allocation routine for health insurance coverage was implemented with the 2011 CPS ASEC and retroactively applied to the 2000 to 2010 CPS ASECs. Allocation methods are commonly used by the Census Bureau to fill in missing data, and are utilized for about 12 to 13 percent of the ASEC responses. Roughly 10 percent of the monthly sample does not fully complete the ASEC and is missing data for all of the health insurance items and about 2 to 3 percent of the cases respond to a large portion of the ASEC, but skip one or more of the health insurance items. This change to the allocation routine reduced the uninsured rate by about 0.5 percentage points in survey year 2009, primarily through an increase in private coverage (Boudreaux and Turner, 2011). In the process of implementing these changes the Census Bureau also discovered and corrected a coding error that caused an undercount to allocated values of directly purchased dependent coverage.

Research by Davern et al. (2007) found incongruence between the Census Bureau's allocation routine and the ASEC survey instrument for health insurance coverage. Specifically, they found that this incongruence led to an underestimate of private coverage and an overestimate of uninsured.

In response to the work by Davern and colleagues (2007) the Census Bureau modified the health insurance allocation specification. The primary changes were that the nuclear family restriction was removed from the allocation routine making it consistent with the survey instrument and the order of the data processing steps was changed to address dual coverage. More people had dual coverage (both public and private coverage) when coverage was allocated than when it was reported. Boudreaux and Turner (2011) provide a detailed description and evaluation of the new allocation routine.

Methods

Our goal is to examine the variation in estimates produced from existing CPS data sources. We are interested in identifying both discrepancies that occur at a cross-section and differences in the change in insurance rates as they evolve over time. To accomplish this task we compare uninsurance rates, public coverage rates, and private coverage rates from the following data series:

- **Original data series**. These data include the 2005-2006 correction and approximation, but are treated with the original allocation routine. Prior to the 2011 data release, these were the official CPS ASEC estimates.
- **Revised data series**. These data are treated with the new allocation routine and additional processing adjustments from 2000 forward. This is the data series analysts should now be using for a consistent time series from 2000 forward.
- **SHADAC-Enhanced data series**. This series was developed by SHADAC to account for methodological changes and to harmonize the CPS ASEC data over time (Ziegenfuss and Davern, 2011 and SHADAC, 2009). The enhanced series makes weighting enhancements by removing the full supplement allocation cases, reweighting to reflect population controls, and smoothing to the decennial Census. Coverage enhancements are made by simulating the impact of the verification question prior to 2000. The SHADAC-Enhanced series was re-run using the revised data series released fall 2011.

Estimates are generated for 1988 to 2011 for the total civilian non-institutionalized population and by race/ethnicity and age groups. In the interest of space we present only uninsurance rates by sub-group. All sub-group analyses are available from the authors upon request. All estimates were generated using Taylor-series linearization to account for the complex sample design. However, readers should note that standard errors from these data cannot be used to generate an independent sample t-test as the samples are not independent. Testing the hypothesis that the difference between any two series is different than zero would require a complex replication method. Given the high degree of correlation between the series, even very small differences are likely to be highly significant.

Results

Total Population

Uninsurance, public, and private coverage rates for the total population are described in Exhibits 2, 3, and 4. The uninsurance rate from the revised series is lower than the uninsurance rate from the original data series in all years (Exhibit 2). There was little change in the public coverage rate (Exhibit 3) and an increase in the private coverage rate for the revised series compared with the original series (Exhibit 4). This pattern is primarily driven by the 2011 change to the allocation routine and is in line with expectations (Boudreaux and Turner, 2011 and Davern et al., 2007).

By removing the full supplement allocation cases and reweighting the data, the SHADAC-Enhanced series accounts for the incongruence in the allocation routine that was improved for 2000 forward with the revised series. The SHADAC-Enhanced series also simulates the impact of the verification question prior to 2000 (Ziegenfuss and Davern, 2011). This brings the 1988 to 2000 period closer in line to the CPS ASEC instrument and allocation routine from 2000 forward. For this reason, we believe the SHADAC-Enhanced series is a more accurate reflection of the population's experience during 1988 to 2000 and is an appealing data source for understanding changes in coverage during this time period.

Sub-Groups

Sub-group uninsurance rates from each series are described in Exhibits 5 and 6 (age) and Exhibits 7, 8, and 9 (race/ethnicity). The same basic story emerges from each data series: declining uninsurance rates for children (age 0-18) and increasing rates for non-elderly adults (age 19-64). The non-Hispanic white population experienced an overall increase in uninsurance, as did non-Hispanic blacks and Hispanics. However, the trend among non-Hispanic blacks and Hispanics was less monotonic than it was for non-Hispanic whites.

Differences between the series for these sub-groups generally mirrored the results found in the total population. Uninsurance rates from the revised series were lower than rates from the original series for all sub-groups studied. The SHADAC-Enhanced series produced uninsurance rates similar or lower than rates from the revised series with the exception of Hispanics, where the uninsurance rate was higher in the SHADAC-Enhanced series. This may be an artifact of the SHADAC-Enhanced series weighting enhancements, but will require further study.

Discussion

We describe health insurance coverage rates from three versions of the CPS ASEC. Our findings show that the revised series and the SHADAC-Enhanced series produced substantially lower rates of uninsurance than did the original series from 2000 forward. The SHADAC-Enhanced series tended to produce slightly lower rates than the revised series, with the exception of the Hispanic population. It is encouraging that the three versions reflect the same general trends over the time period.

With the implementation of the new allocation routine and data processing adjustments from 2000 forward the revised series provides an improved and consistent time series and should be used in place of the original series. Since the revised series does not extend prior to 2000, we believe the SHADAC-Enhanced series (with reweighting and simulation of the verification question) reflects a more accurate picture of health insurance coverage from 1988 to 2000 and should be used for analysis involving this time period.

References

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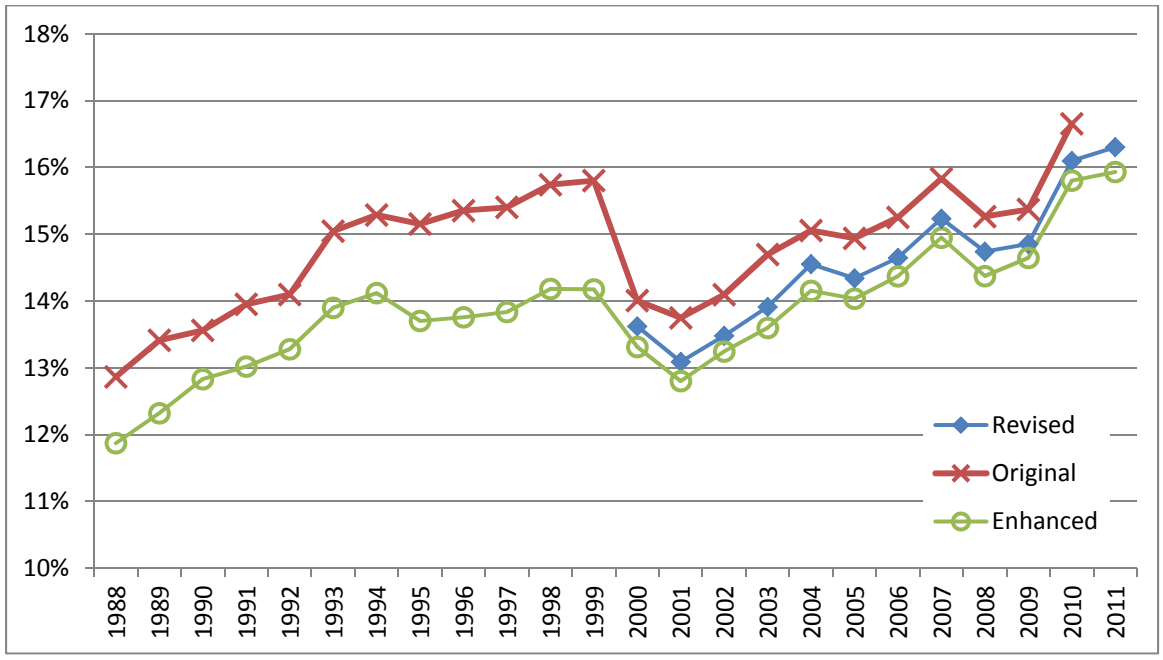
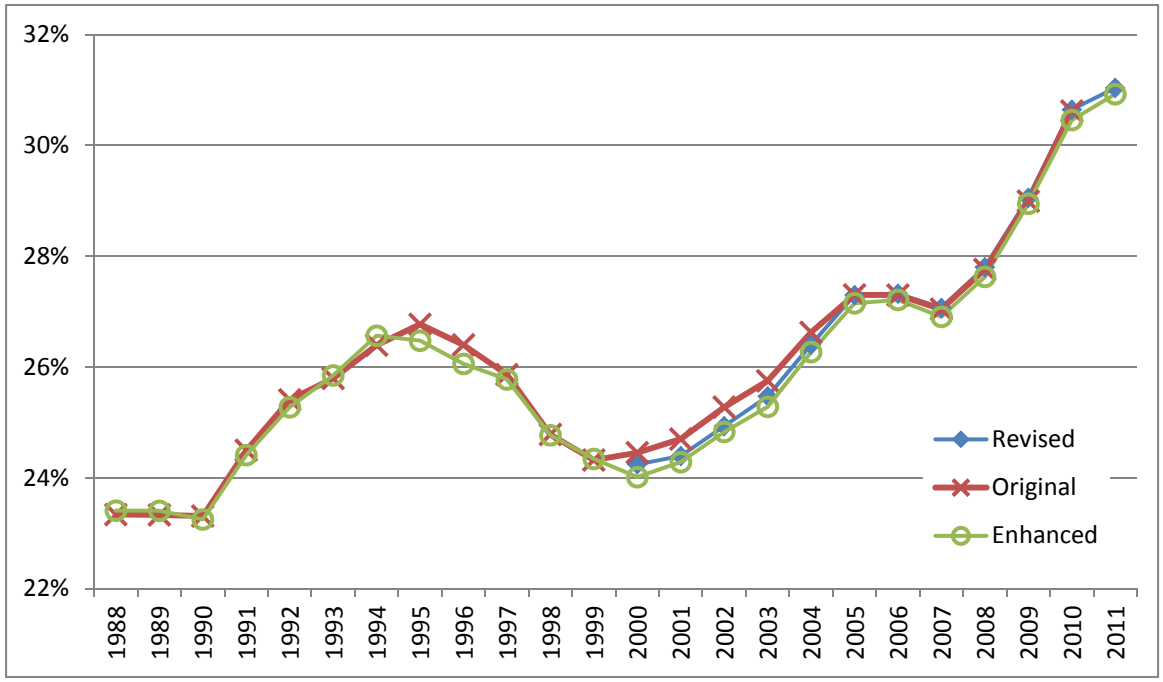
Exhibit 2. Estimates of Uninsurance by Data Series, CPS ASEC 1988-2011



	Revised		Original		Enhanced	
Year	Percent	SE	Percent	SE	Percent	SE
1988	--	--	12.9	0.15	11.9	0.15
1989	--	--	13.4	0.17	12.3	0.17
1990	--	--	13.6	0.16	12.8	0.16
1991	--	--	13.9	0.16	13.0	0.16
1992	--	--	14.1	0.16	13.3	0.16
1993	--	--	15.0	0.16	13.9	0.17
1994	--	--	15.3	0.17	14.1	0.17
1995	--	--	15.2	0.17	13.7	0.17
1996	--	--	15.4	0.17	13.8	0.18
1997	--	--	15.4	0.17	13.8	0.17
1998	--	--	15.7	0.17	14.2	0.17
1999	--	--	15.8	0.17	14.2	0.17
2000	13.6	0.17	14.0	0.17	13.3	0.17
2001	13.1	0.13	13.7	0.14	12.8	0.14
2002	13.5	0.14	14.1	0.14	13.2	0.14
2003	13.9	0.13	14.7	0.14	13.6	0.14
2004	14.6	0.14	15.1	0.14	14.2	0.15
2005	14.3	0.14	14.9	0.14	14.0	0.15
2006	14.6	0.14	15.3	0.14	14.4	0.14
2007	15.2	0.14	15.8	0.14	14.9	0.15
2008	14.7	0.14	15.3	0.14	14.4	0.14
2009	14.9	0.14	15.4	0.14	14.6	0.14
2010	16.1	0.14	16.7	0.14	15.8	0.15
2011	16.3	0.14	--	--	15.9	0.15

Source: 1988-2011 CPS ASECs; analysis conducted by SHADAC

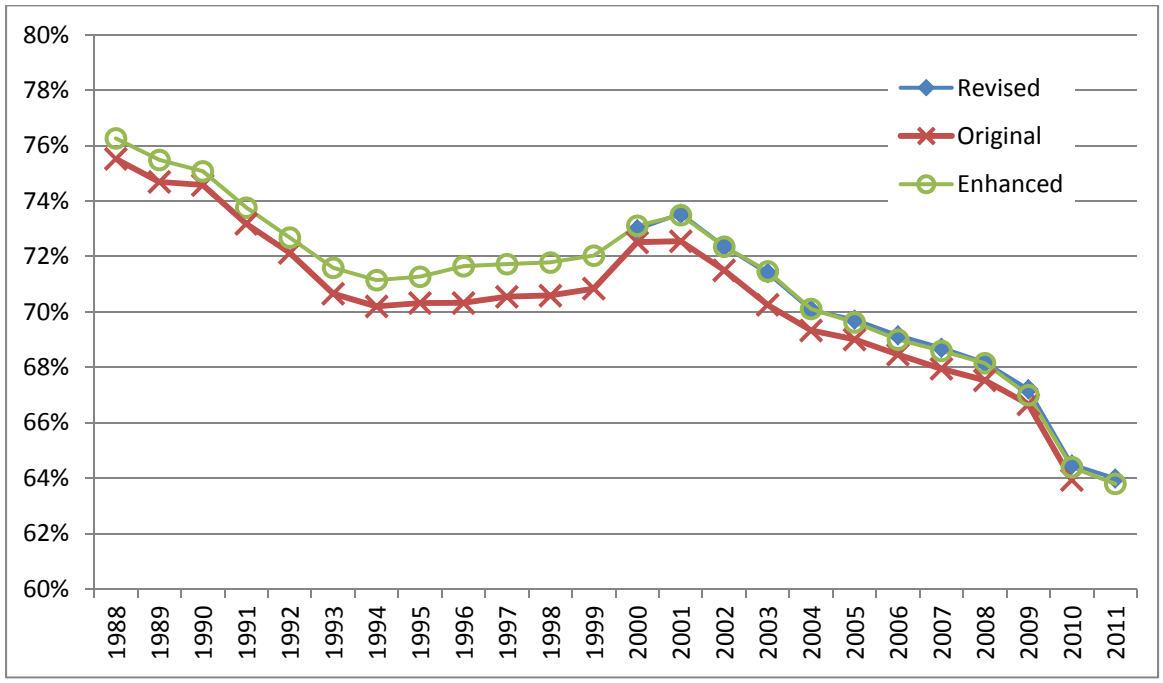
Exhibit 3. Estimates of Public Coverage by Data Series, CPS ASEC 1988-2011



	Revised		Original		Enhanced	
Year	Percent	SE	Percent	SE	Percent	SE
1988	--	--	23.3	0.19	23.4	0.20
1989	--	--	23.3	0.20	23.4	0.21
1990	--	--	23.3	0.19	23.2	0.20
1991	--	--	24.5	0.19	24.4	0.21
1992	--	--	25.4	0.20	25.3	0.21
1993	--	--	25.8	0.20	25.8	0.21
1994	--	--	26.4	0.20	26.6	0.21
1995	--	--	26.8	0.20	26.5	0.22
1996	--	--	26.4	0.21	26.1	0.22
1997	--	--	25.9	0.21	25.8	0.22
1998	--	--	24.8	0.20	24.8	0.21
1999	--	--	24.3	0.20	24.3	0.21
2000	24.2	0.20	24.5	0.20	24.0	0.21
2001	24.4	0.16	24.7	0.16	24.3	0.17
2002	24.9	0.16	25.3	0.17	24.8	0.17
2003	25.5	0.16	25.7	0.16	25.3	0.17
2004	26.4	0.17	26.6	0.17	26.3	0.18
2005	27.3	0.17	27.3	0.17	27.1	0.18
2006	27.3	0.17	27.3	0.17	27.2	0.18
2007	27.1	0.17	27.0	0.17	26.9	0.18
2008	27.8	0.17	27.8	0.17	27.6	0.18
2009	29.1	0.17	29.0	0.17	28.9	0.18
2010	30.6	0.17	30.6	0.17	30.5	0.18
2011	31.0	0.18	--	--	30.9	0.19

Source: 1988-2011 CPS ASECs; analysis conducted by SHADAC

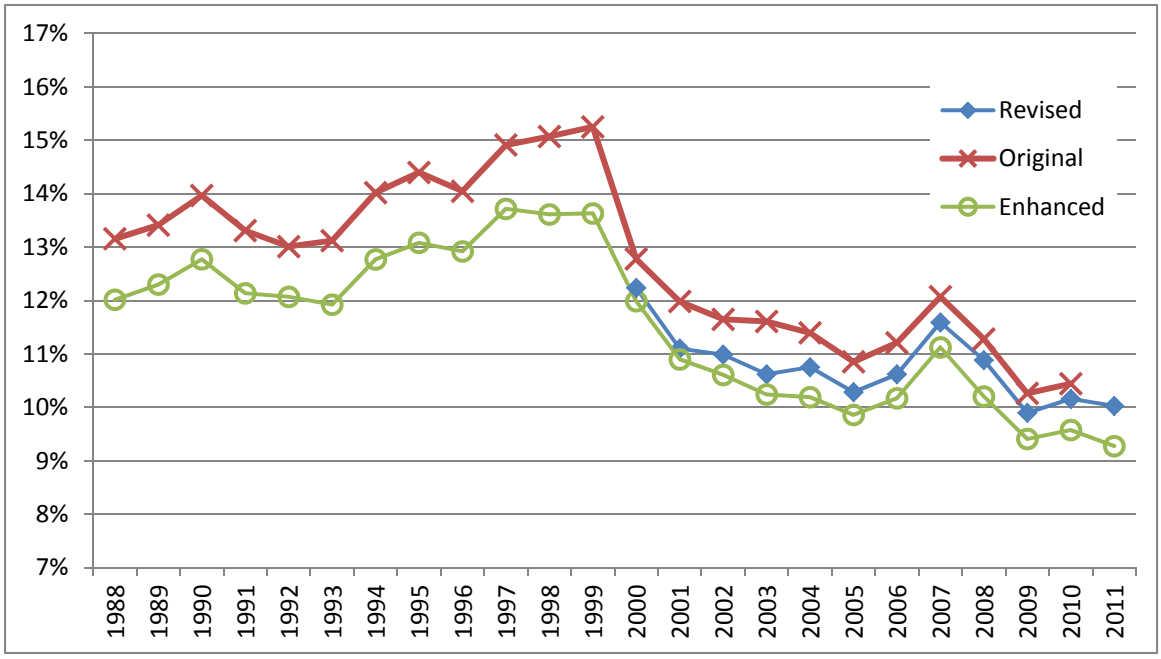
Exhibit 4. Estimates of Private Coverage by Data Series, CPS ASEC 1988-2011



	Revised		Original		Enhanced	
Year	Percent	SE	Percent	SE	Percent	SE
1988	--	--	75.5	0.20	76.3	0.21
1989	--	--	74.7	0.22	75.5	0.23
1990	--	--	74.6	0.20	75.1	0.22
1991	--	--	73.2	0.21	73.8	0.22
1992	--	--	72.1	0.22	72.7	0.23
1993	--	--	70.7	0.22	71.6	0.23
1994	--	--	70.2	0.23	71.1	0.23
1995	--	--	70.3	0.23	71.3	0.24
1996	--	--	70.3	0.24	71.6	0.25
1997	--	--	70.6	0.23	71.7	0.24
1998	--	--	70.6	0.23	71.8	0.24
1999	--	--	70.8	0.23	72.0	0.24
2000	73.0	0.23	72.5	0.23	73.1	0.24
2001	73.5	0.18	72.6	0.19	73.5	0.20
2002	72.4	0.19	71.5	0.19	72.4	0.20
2003	71.4	0.19	70.3	0.19	71.5	0.20
2004	70.1	0.19	69.3	0.19	70.1	0.20
2005	69.7	0.19	69.0	0.19	69.6	0.21
2006	69.2	0.19	68.5	0.19	69.0	0.20
2007	68.7	0.19	67.9	0.19	68.6	0.21
2008	68.2	0.19	67.5	0.19	68.2	0.20
2009	67.2	0.19	66.7	0.19	67.0	0.20
2010	64.5	0.20	63.9	0.20	64.4	0.21
2011	64.0	0.20	--	--	63.8	0.21

Source: 1988-2011 CPS ASECs; analysis conducted by SHADAC

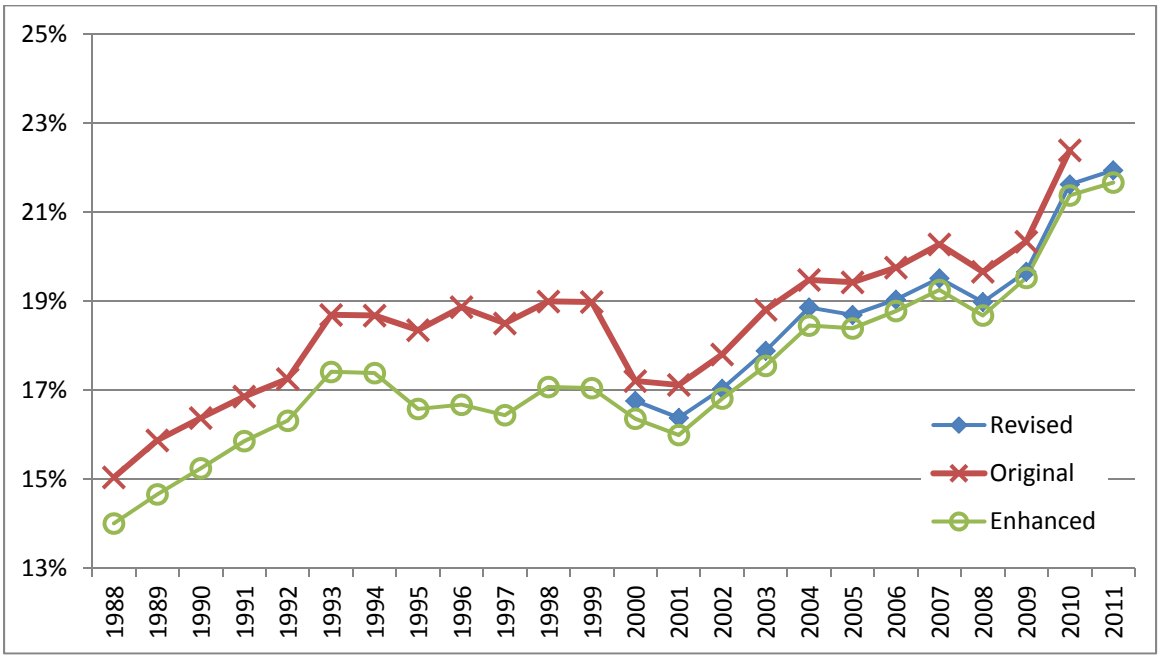
Exhibit 5. Estimates of Uninsurance for Ages 0-18 by Data Series, CPS ASEC 1988-2011



	Revised		Original		Enhanced	
Year	Percent	SE	Percent	SE	Percent	SE
1988	--	--	13.2	0.27	12.0	0.26
1989	--	--	13.4	0.29	12.3	0.29
1990	--	--	14.0	0.28	12.8	0.27
1991	--	--	13.3	0.27	12.1	0.27
1992	--	--	13.0	0.27	12.1	0.27
1993	--	--	13.1	0.26	11.9	0.26
1994	--	--	14.0	0.27	12.8	0.27
1995	--	--	14.4	0.29	13.1	0.29
1996	--	--	14.0	0.29	12.9	0.29
1997	--	--	14.9	0.30	13.7	0.30
1998	--	--	15.1	0.30	13.6	0.29
1999	--	--	15.3	0.30	13.6	0.30
2000	12.2	0.28	12.8	0.28	12.0	0.29
2001	11.1	0.21	12.0	0.22	10.9	0.23
2002	11.0	0.22	11.6	0.22	10.6	0.23
2003	10.6	0.21	11.6	0.22	10.2	0.21
2004	10.8	0.21	11.4	0.21	10.2	0.21
2005	10.3	0.21	10.9	0.21	9.9	0.22
2006	10.6	0.21	11.2	0.21	10.2	0.22
2007	11.6	0.22	12.1	0.22	11.1	0.23
2008	10.9	0.22	11.3	0.22	10.2	0.22
2009	9.9	0.20	10.3	0.21	9.4	0.21
2010	10.2	0.21	10.4	0.21	9.6	0.21
2011	10.0	0.21	--	--	9.3	0.22

Source: 1988-2011 CPS ASECs; analysis conducted by SHADAC

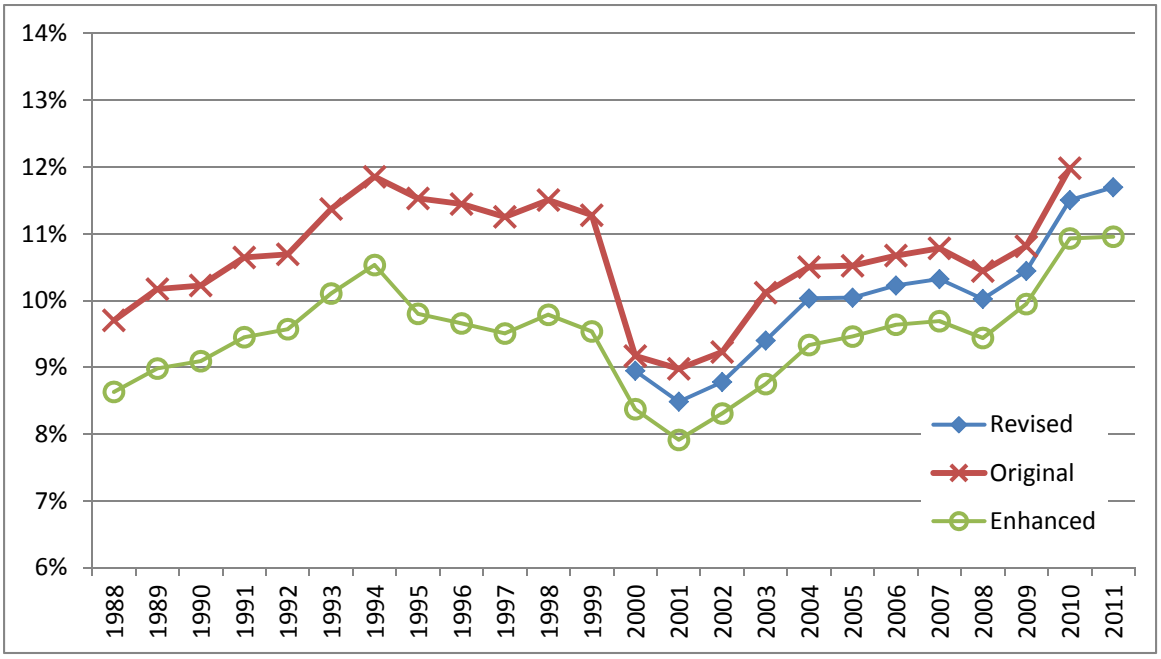
Exhibit 6. Estimates of Uninsurance for Ages 19-64 by Data Series, CPS ASEC 1988-2011



	Revised		Original		Enhanced	
Year	Percent	SE	Percent	SE	Percent	SE
1988	--	--	15.0	0.17	14.0	0.17
1989	--	--	15.9	0.19	14.7	0.20
1990	--	--	16.4	0.18	15.2	0.18
1991	--	--	16.9	0.18	15.9	0.19
1992	--	--	17.2	0.18	16.3	0.19
1993	--	--	18.7	0.19	17.4	0.20
1994	--	--	18.7	0.20	17.4	0.20
1995	--	--	18.3	0.19	16.6	0.20
1996	--	--	18.9	0.20	16.7	0.21
1997	--	--	18.5	0.20	16.4	0.20
1998	--	--	19.0	0.20	17.1	0.20
1999	--	--	19.0	0.20	17.0	0.20
2000	16.8	0.19	17.2	0.19	16.4	0.20
2001	16.4	0.16	17.1	0.16	16.0	0.17
2002	17.0	0.17	17.8	0.17	16.8	0.18
2003	17.9	0.17	18.8	0.17	17.5	0.18
2004	18.9	0.17	19.5	0.18	18.4	0.18
2005	18.7	0.18	19.4	0.18	18.4	0.19
2006	19.0	0.17	19.7	0.18	18.8	0.18
2007	19.5	0.18	20.3	0.18	19.2	0.19
2008	19.0	0.17	19.7	0.17	18.7	0.18
2009	19.7	0.18	20.3	0.18	19.5	0.19
2010	21.6	0.18	22.4	0.18	21.4	0.19
2011	21.9	0.18	--	--	21.7	0.19

Source: 1988-2011 CPS ASECs; analysis conducted by SHADAC

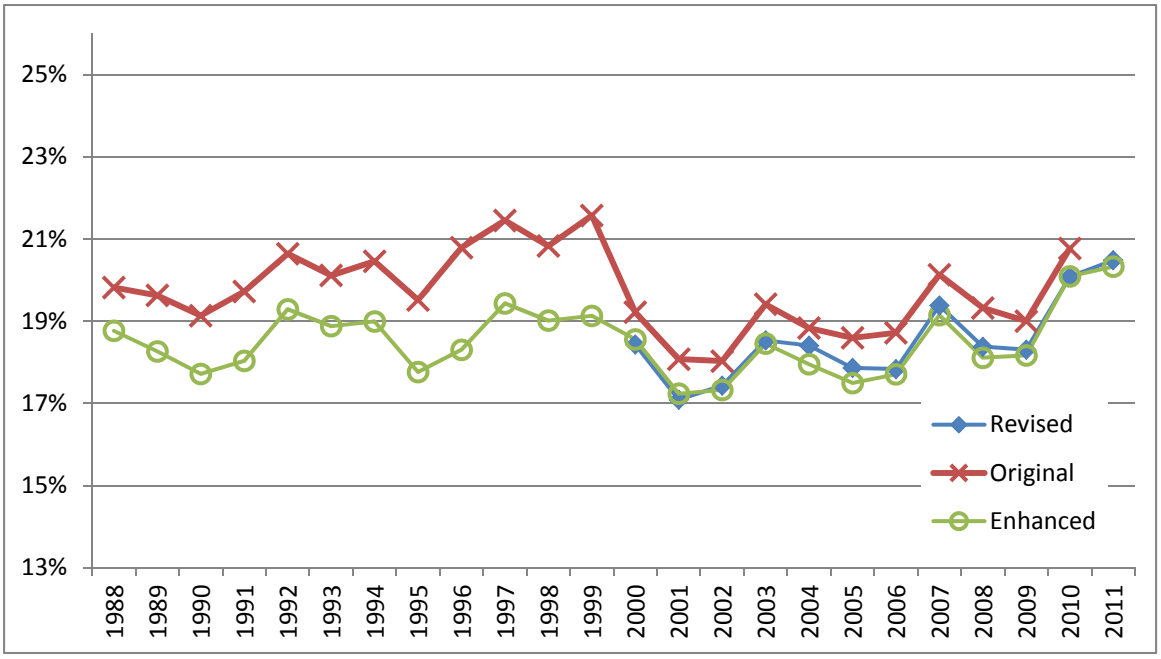
Exhibit 7. Estimates of Uninsurance for Non-Hispanic Whites by Data Series, CPS ASEC 1988-2011



	Revised		Original		Enhanced	
Year	Percent	SE	Percent	SE	Percent	SE
1988	--	--	9.7	0.15	8.6	0.14
1989	--	--	10.2	0.16	9.0	0.16
1990	--	--	10.2	0.15	9.1	0.15
1991	--	--	10.6	0.16	9.5	0.16
1992	--	--	10.7	0.16	9.6	0.16
1993	--	--	11.4	0.16	10.1	0.16
1994	--	--	11.9	0.17	10.5	0.16
1995	--	--	11.5	0.17	9.8	0.16
1996	--	--	11.4	0.18	9.7	0.17
1997	--	--	11.3	0.18	9.5	0.17
1998	--	--	11.5	0.17	9.8	0.16
1999	--	--	11.3	0.17	9.5	0.16
2000	8.9	0.16	9.2	0.16	8.4	0.16
2001	8.5	0.12	9.0	0.13	7.9	0.13
2002	8.8	0.13	9.2	0.13	8.3	0.13
2003	9.4	0.13	10.1	0.14	8.7	0.13
2004	10.0	0.14	10.5	0.14	9.3	0.14
2005	10.0	0.14	10.5	0.14	9.5	0.14
2006	10.2	0.14	10.7	0.14	9.6	0.14
2007	10.3	0.14	10.8	0.14	9.7	0.14
2008	10.0	0.14	10.4	0.14	9.4	0.14
2009	10.4	0.14	10.8	0.14	9.9	0.14
2010	11.5	0.15	12.0	0.15	10.9	0.15
2011	11.7	0.15	--	--	11.0	0.16

Source: 1988-2011 CPS ASECs; analysis conducted by SHADAC

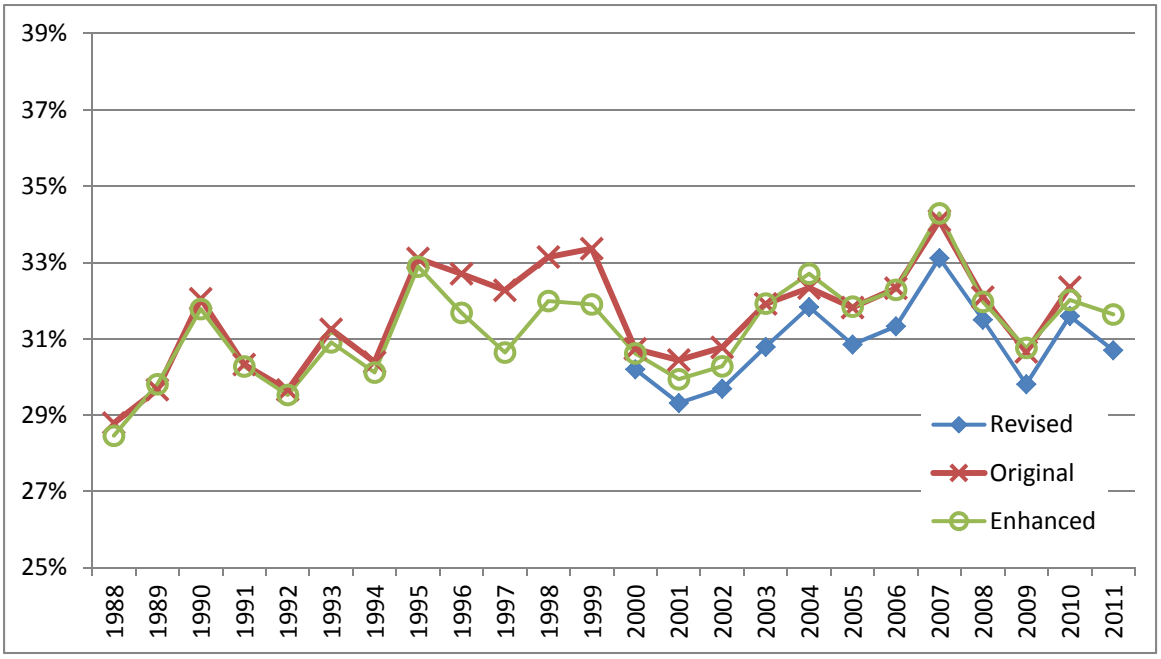
Exhibit 8. Estimates of Uninsurance for Non-Hispanic Blacks by Data Series, CPS ASEC 1988-2011



	Revised		Original		Enhanced	
Year	Percent	SE	Percent	SE	Percent	SE
1988	--	--	19.8	0.55	18.8	0.57
1989	--	--	19.6	0.59	18.3	0.61
1990	--	--	19.1	0.55	17.7	0.57
1991	--	--	19.7	0.54	18.0	0.57
1992	--	--	20.6	0.57	19.3	0.60
1993	--	--	20.1	0.55	18.9	0.59
1994	--	--	20.5	0.57	19.0	0.58
1995	--	--	19.5	0.55	17.8	0.58
1996	--	--	20.8	0.59	18.3	0.58
1997	--	--	21.4	0.60	19.4	0.61
1998	--	--	20.8	0.60	19.0	0.61
1999	--	--	21.6	0.61	19.1	0.60
2000	18.4	0.57	19.2	0.57	18.6	0.61
2001	17.1	0.40	18.1	0.41	17.2	0.44
2002	17.4	0.40	18.0	0.41	17.3	0.43
2003	18.5	0.41	19.4	0.42	18.5	0.43
2004	18.4	0.42	18.8	0.42	18.0	0.44
2005	17.9	0.43	18.6	0.44	17.5	0.46
2006	17.8	0.42	18.7	0.43	17.7	0.45
2007	19.4	0.44	20.1	0.44	19.1	0.47
2008	18.4	0.43	19.3	0.43	18.1	0.45
2009	18.3	0.41	19.0	0.41	18.2	0.43
2010	20.1	0.43	20.8	0.43	20.1	0.45
2011	20.5	0.42	--	--	20.3	0.45

Source: 1988-2011 CPS ASECs; analysis conducted by SHADAC

Exhibit 9. Estimates of Uninsurance for Hispanics by Data Series, CPS ASEC 1988-2011



	Revised		Original		Enhanced	
Year	Percent	SE	Percent	SE	Percent	SE
1988	--	--	28.8	0.66	28.5	0.69
1989	--	--	29.7	0.77	29.8	0.81
1990	--	--	32.0	0.65	31.8	0.68
1991	--	--	30.3	0.61	30.3	0.64
1992	--	--	29.7	0.59	29.5	0.62
1993	--	--	31.2	0.60	30.9	0.63
1994	--	--	30.4	0.62	30.1	0.64
1995	--	--	33.1	0.64	32.9	0.68
1996	--	--	32.7	0.62	31.7	0.65
1997	--	--	32.3	0.59	30.6	0.60
1998	--	--	33.1	0.59	32.0	0.60
1999	--	--	33.4	0.57	31.9	0.60
2000	30.2	0.55	30.7	0.55	30.6	0.59
2001	29.3	0.50	30.4	0.50	29.9	0.55
2002	29.7	0.48	30.8	0.48	30.3	0.52
2003	30.8	0.50	31.9	0.50	31.9	0.53
2004	31.8	0.50	32.3	0.49	32.7	0.52
2005	30.8	0.48	31.8	0.48	31.8	0.52
2006	31.3	0.47	32.3	0.47	32.3	0.50
2007	33.1	0.47	34.1	0.47	34.3	0.50
2008	31.5	0.46	32.1	0.46	32.0	0.48
2009	29.8	0.44	30.7	0.44	30.8	0.47
2010	31.6	0.43	32.4	0.43	32.0	0.45
2011	30.7	0.43	--	--	31.6	0.45

Source: 1988-2011 CPS ASECs; analysis conducted by SHADAC