

A Correction for the Full-Supplement Imputation Bias in the Current Population Survey's Annual and Social Economic Supplement

Jeanette Ziegenfuss, Ph.D.

**Division of Health Care Policy & Research
Mayo Clinic**

*Bias & Nonresponse I, May 16, 2009
American Association for Public Opinion Research*



Acknowledgements

- Co-authors:

- Michael Davern, Ph.D.
- Amy Godecker, Ph.D.
- Michele Burlew, M.S.

- Extension of:

Davern, M, H Rodin, LA Blewett & K Thiede Call. (2007). *Are the Current Population Survey uninsurance estimates too high? An examination of the imputation process.* Health Services Research, 42(5): 2038-2055.



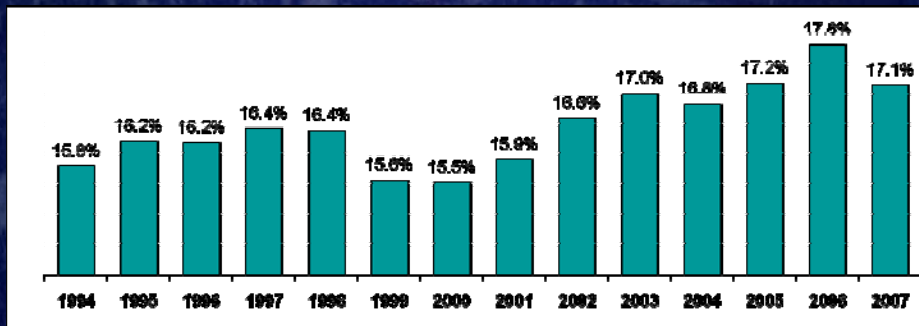
Background – CPS

- Current Population Survey Annual Social and Economic Supplement (CPS-ASEC)
 - Widely used for national and state-level policy research
 - Fielded February-April annually
 - 2008 CPS has 206,404 individuals from 75,872 households



Background – CPS

Percentage of Nonelderly Americans Without Health Insurance Coverage, 1994-2007



Source: SHADAC estimates from the Current Population Survey Annual Social and Economic Supplements, 1995-2008. Note: 1995-2003 data are adjusted for Census correction announced in March 2007



Background – CPS

- Health insurance status fully edited and imputed
- 10.8% of individuals do not answer the health insurance supplement



Background – Imputation Bias

- Introduces bias in rate of uninsurance by approximately 1 percent
- Millions more people are counted as uninsured
- Likely due to ability to assign coverage to whole household in completed supplements but not in imputation
- The Census Bureau is aware of this problem, but has not revised imputation strategy

(Davern et al., *Health Services Research*, 2007)



Background – Imputation Bias

- “At any time in 2007 was anyone in this household covered by a health insurance plan provided through (their/your) current or former employer or union?”
 - Yes
 - No
- “Who in this household were policyholders?”
 - Enter all that apply
- “In addition to (name/you) who else in this household was covered by (name’s/your) plan?”
 - Enter all that apply
 - Enter ‘0’ if no one
 - Enter ‘96’ for all persons



Results – Uninsurance Rates, 2006-2007

	Number of supplements completed in HH			
	One or more	None	Difference	
Not US Born	37.4%	32.3%	-5.1%	***
US Born	13.7%	24.5%	10.9%	***
Hispanic	34.7%	32.5%	-2.2%	***
White	11.2%	23.4%	12.2%	***
Black	20.1%	27.5%	7.4%	***
Other	17.2%	26.1%	8.8%	***
Less than HS	41.5%	37.0%	-4.5%	**
HS	24.3%	28.0%	3.7%	***
Some College	16.5%	27.6%	11.1%	***
College	9.8%	23.7%	13.9%	***
Postgrad	4.5%	18.7%	14.2%	***
Total	16.7%	25.6%	8.9%	***



Research Objective

- To create an alternative set of weights for the CPS-ASEC that eliminates the bias introduced by the full-supplement imputation



Methods

- Remove individuals without a complete health insurance supplement in household
 - Keep household intact
 - Do not “throw away” data
- Reweight (‘rake’) remaining cases to population control totals by state then race, ethnicity, gender, age, and family relationship



Methods, cont.

	Person level, distribution of complete supplement by HH		
	HH has all FL665=1	HH has some FL665=1	HH has no FL665=1
1996	88.6	0.6	10.8
...			
2005	89.2	1.1	9.7
2006	90.0	1.2	8.8
2007	89.5	1.4	9.2
2008	90.4	1.4	8.2



Methods, cont.

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2008	90.4	1.4	8.2



14.4 % unin.



23.2 % unin.



Results – Revised Weights

	CPS	Reweight
Under 65	15.3%	14.6%



Results – Revised Weights

	CPS	Reweight	One complete supplement
Under 65	15.3%	14.6%	14.4%



Results – Revised Weights

	CPS	Reweight	One complete supplement	No complete supplement
Under 65	15.3%	14.6%	14.4%	23.2%



Results – Revised Weights

	CPS	Reweight
Female	16.0%	15.1%
Male	19.0%	18.4%
<18	11.3%	10.5%
18-24	28.7%	28.3%
25-34	26.3%	25.6%
35-44	18.5%	17.8%
45-54	15.4%	14.6%
55-64	12.4%	11.4%
<100%	33.9%	33.1%
100-199	30.1%	29.8%
200-299	20.5%	20.0%
300-399	12.8%	12.0%
400+	7.0%	6.0%
Not US Born	36.9%	37.3%
US Born	14.7%	13.7%
Hispanic	34.5%	34.9%
White	12.3%	11.3%
Black	21.0%	20.2%
Other	18.1%	17.3%



Results – Revised Weights

	CPS	Reweight	One complete supplement
Female	16.0%	15.1%	15.0%
Male	19.0%	18.4%	18.3%
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45-54	15.4%	14.6%	14.6%
55-64	12.4%	11.4%	11.3%
<100%	33.9%	33.1%	33.0%
100-199	30.1%	29.8%	29.8%
200-299	20.5%	20.0%	19.9%
300-399	12.8%	12.0%	11.9%
400+	7.0%	6.0%	6.0%
Not US Born	36.9%	37.3%	37.4%
US Born	14.7%	13.7%	13.7%
Hispanic	34.5%	34.9%	34.7%
White	12.3%	11.3%	11.2%
Black	21.0%	20.2%	20.1%
Other	18.1%	17.3%	17.2%



Results – Revised Weights

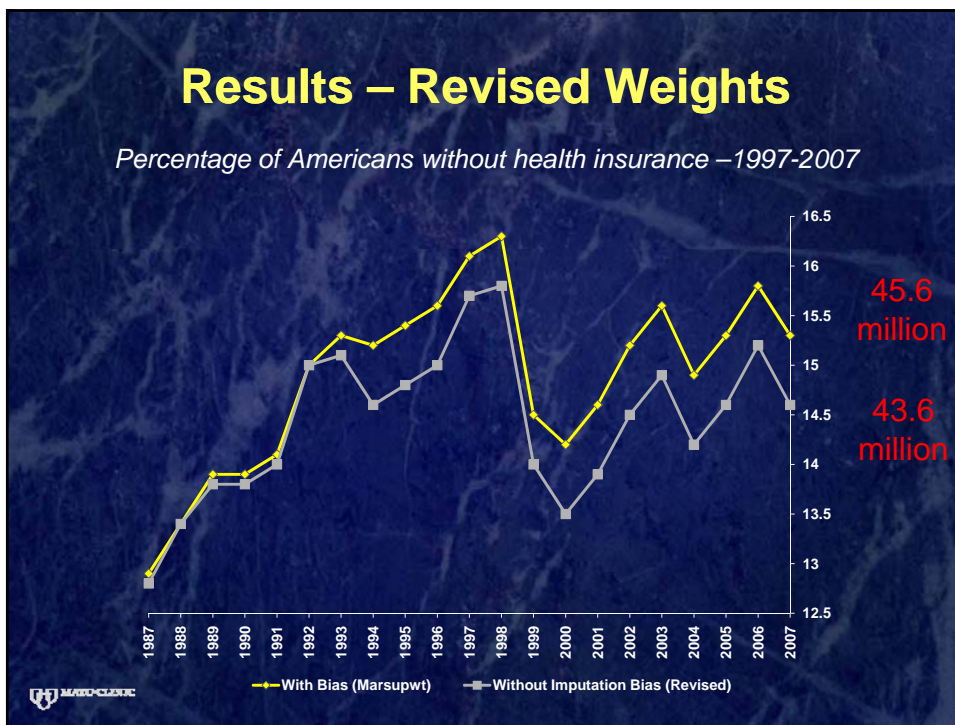
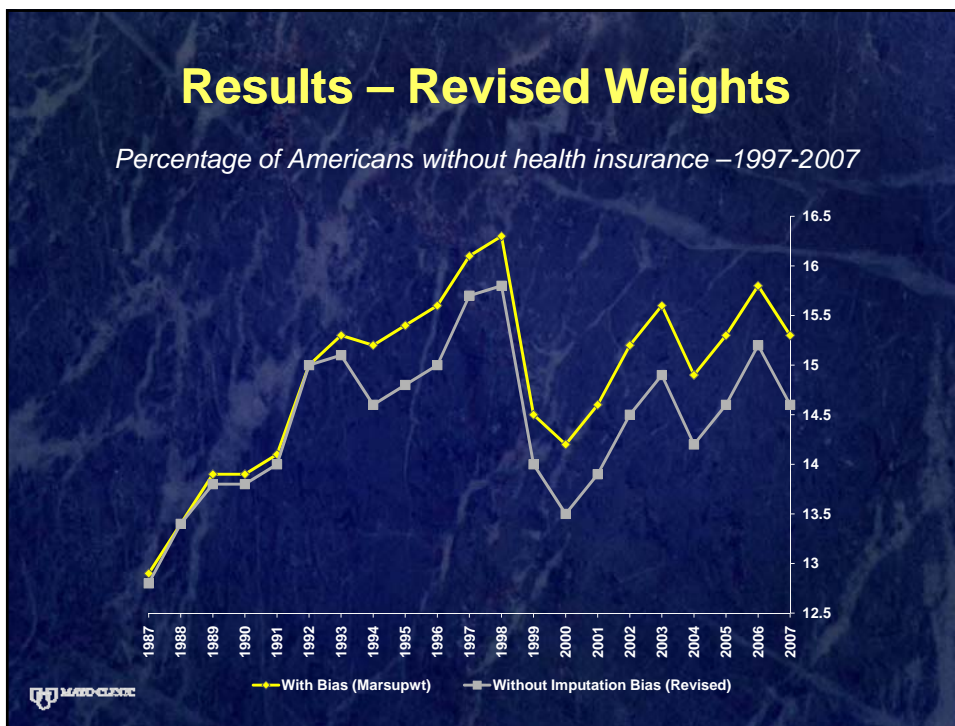
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35-44	18.5%	17.8%	17.7%
45-54	15.4%	14.6%	14.6%
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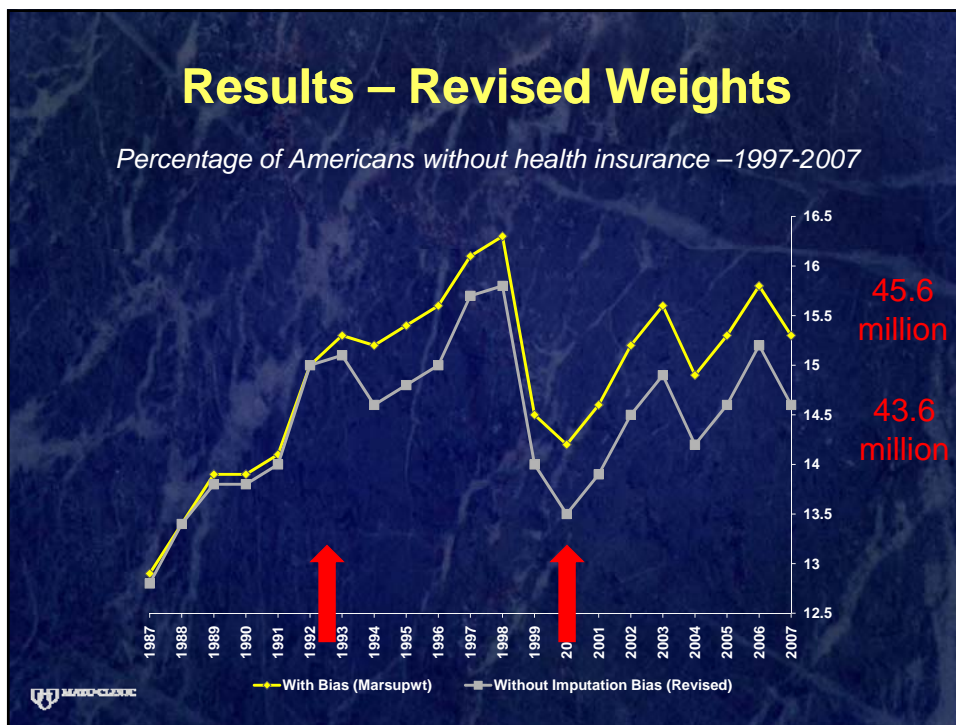
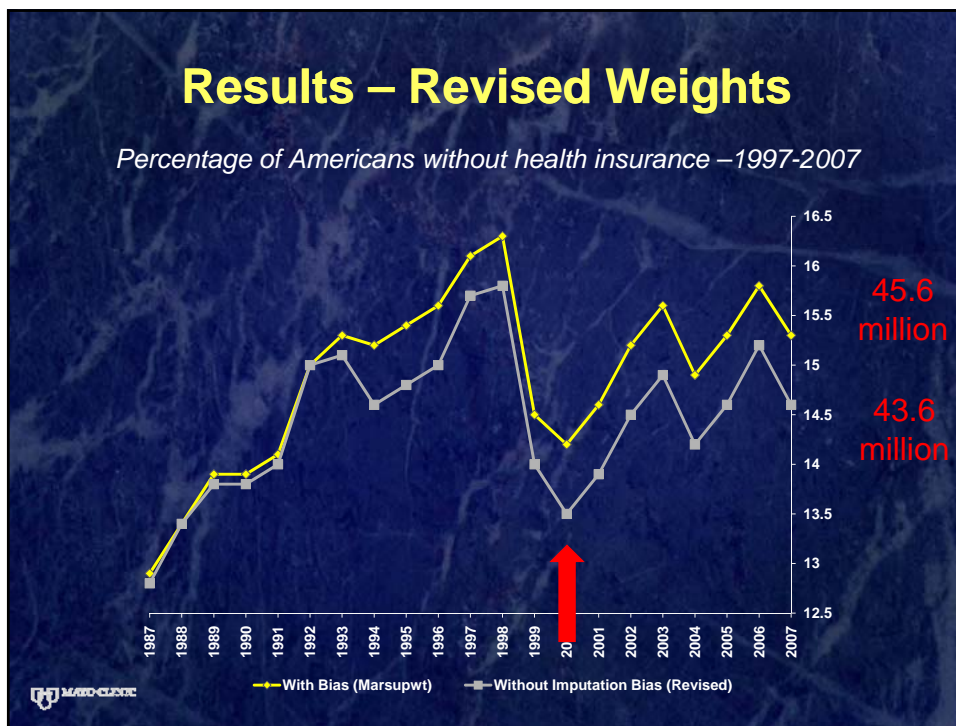


Results – Revised Weights

	CPS	Reweight	One complete supplement	No complete supplement
Female	16.0%	15.1%	15.0%	25.7%
Male	19.0%	18.4%	18.3%	25.4%
<18	11.3%	10.5%	10.5%	20.7%
18-24	28.7%	28.3%	28.2%	32.5%
25-34	26.3%	25.6%	25.6%	33.5%
35-44	18.5%	17.8%	17.7%	26.4%
45-54	15.4%	14.6%	14.6%	22.0%
55-64	12.4%	11.4%	11.3%	22.7%
<100%	33.9%	33.1%	33.0%	41.9%
100-199	30.1%	29.8%	29.8%	34.1%
200-299	20.5%	20.0%	19.9%	26.2%
300-399	12.8%	12.0%	11.9%	22.1%
400+	7.0%	6.0%	6.0%	17.5%
Not US Born	36.9%	37.3%	37.4%	32.3%
US Born	14.7%	13.7%	13.7%	24.5%
Hispanic	34.5%	34.9%	34.7%	32.5%
White	12.3%	11.3%	11.2%	23.4%
Black	21.0%	20.2%	20.1%	27.5%
Other	18.1%	17.3%	17.2%	26.1%







Conclusions

- The full supplement imputation introduces bias in estimates of insurance coverage
- Although Census is working on a change, need alternative adjustment for retrospective time series



Conclusions, cont.

- Alternative weights provide an adjustment so imputation itself does not introduce error
- Whether Census should allow “all covered” either in the survey or during imputation is an open question



Conclusions, cont.

- Data be available through IPUMS and SHADAC
- Other “enhancements” to include:
 - Imputation of verification question (1999 and earlier)
 - Smoothing of population control totals 1990 and 2000
 - Implementation of edit change (allemp and allpriv) (2004 and earlier)



Contact Information

Jeanette Ziegenfuss, Ph.D.

Division of Health Care Policy &
Research, Mayo Clinic

Ziegenfuss.jeanette@mayo.edu

www.shadac.org

<http://cps.ipums.org/cps/>



Results – Demographics

- Among households without at least one complete supplement, the following are underrepresented
 - Children
 - US Born
 - Hispanic
 - White
 - PT Workers
 - Higher education
 - Married
- And the following are overrepresented
 - 45-54 year olds
 - Not born in US
 - Black
 - Not working
 - HS education only
 - Not married



	Number of supplements completed in HH		
	One or more	None	
<18	28.7%	25.2%	***
18-24	10.7%	12.9%	***
25-34	15.3%	15.4%	
35-44	16.2%	16.2%	
45-54	16.6%	17.8%	***
55-64	12.5%	12.5%	
Not U,S, Born	12.6%	13.4%	*
U,S Born	87.4%	86.6%	*
Hispanic	16.6%	14.4%	***
White	64.2%	62.0%	***
Black	12.9%	16.9%	***
Other	6.4%	6.6%	
Not Working	20.8%	22.0%	**
PT Work	13.2%	12.3%	**
FT Work	66.0%	65.7%	
< H.S.	13.1%	12.4%	
HS Grad	29.6%	34.1%	***
Some Coll	20.3%	20.2%	
College Grad	27.9%	25.8%	***
Postgrad	9.2%	7.6%	***
Not Married	44.2%	48.2%	***
Married	55.8%	51.8%	***

Results – By State

- Among households without at least one complete supplement, the following states are underrepresented
 - AL, AR, CA, DE, HI, ID, ME, MD, MN, MT, NV, NH, NM, NC, ND, OK, OR, SC, SD, VA, WA, WY
- And the following are overrepresented
 - CT, NJ, NY, PA, UT, VT

