TECHNICAL APPENDIX

Measurement Error in Public Health Insurance Reporting in the American Community Survey: Evidence from Record Linkage

Michel H. Boudreaux, Kathleen T. Call, Joanna Turner, Brett Fried, Brett O'Hara

Technical Appendix:
Measurement Error in Public Health Insurance Reporting in the American Community Survey: Evidence from Record Linkage

This appendix provides supplementary information on methods and results that are not included in the main paper. The referenced Appendix tables and figures are included at the end of the document.

The 2009 ACS Health Insurance Question

The 2009 ACS health insurance question is presented in Appendix Figure 1 (located at end of document). The Medicaid Plus variable is captured by response item [d.].

Determining Enrollment Status on the Day of Interview

The MSIS tracks days of enrollment per month and the ACS tracks coverage held on the specific day of interview. To infer whether an ACS case was enrolled on the day of interview we borrowed an approach previously used in a record-check study of the National Health Interview Survey.[1] If an ACS record was shown in the MSIS to be enrolled for the entire month in which the ACS interview was conducted we code the person as enrolled. Similarly, if the case had 0 days of enrollment in the interview month we considered the case to lack enrollment on the interview date. When MSIS indicated enrollment for only part of the interview month we used the following procedure to determine enrollment on the day of interview: 1) If MSIS indicated enrollment for the entire month prior to interview, but no enrollment in the month subsequent to interview, then we assumed the interview month enrollment period occurred at the beginning of the month. We considered the ACS record to be enrolled if the interview date occurred in the assumed interview month enrollment period. For example, if an ACS interview occurred on August 5 and in MSIS the individual was enrolled all of July and for 10 days in August then we would consider the individual enrolled. 2) If MSIS suggests enrollment for the entire month after interview, but for no days in the month prior to interview, we assume the enrollment period occurred at the end of the month and consider the ACS record to be enrolled if the interview date occurred in the assumed enrollment period. For example, if an ACS interview occurred on August 25 and in MSIS the individual was enrolled all of September and for 10 days in August we would consider the individual enrolled 3) In the rare cases where the MSIS indicates no (or partial) enrollment in the month prior and no (or partial) enrollment in the month subsequent to interview, we calculated the probability that a continuous eligibility period, lasting for a length indicated by the days of enrollment variable, covered the interview date. We then imputed enrollment by comparing this probability to a random draw from a uniform distribution. The enrollment status of the overwhelming majority of ACS cases (99.3%) was obtained because the MSIS suggested full or no enrollment in the month of interview.

[1] SNACC Phase IV Research Results. Available at:
http://www.census.gov/did/www/snacc/docs/SNACC_Phase_IV_Full_Report.pdf

Appendix Table 1: Adjusted Weights

We adjusted the ACS sample weights to account for missing Protected Identification Keys (PIKs) in the ACS (9.2% were missing). The original sample weight was adjusted by the ratio of the population estimate in the full ACS file to the population estimate from the subsample with valid PIKs. Population estimates were produced for subgroups defined by cross-classifying state (51 jurisdictions), age (0-18, 19-64, 65+), race (Non-Hispanic White, Non-Hispanic Non-White, Hispanic), poverty status (0-199, 200+), and health insurance status (Any Medicaid Plus, Any Other Coverage, Uninsured). A small minority of strata were collapsed when the cross-classified cells had exceedingly small sample sizes.

Appendix Table 1 describes the characteristics of the full sample using the original weight (column A), the characteristics of the subsample that had a valid PIK using the original weight (column B), the characteristics of the subsample with a valid PIK using the adjusted weight (column C), and the characteristics of the sample without a PIK (column D). For the most part, the estimate using the adjusted weight mirrored the original estimates from the full file, reducing the bias present when comparing columns A and B. The largest difference between the original and adjusted estimates was 1.5 percentage points for citizenship status. We did not include citizenship status in the weighting routine because it would have produced an overabundance of small cells. However, for most of the characteristics that we examine in the main paper, including insurance coverage, race, age and poverty, the difference between the original and adjusted estimates was small.

Appendix Table 2. False-Negative Rates by Weight for Selected Demographic Groups

Appendix Table 2 presents false-negative rates from the linked file using the original ACS sample weight and the adjusted rate. We have omitted standard errors and statistical testing from the table because the estimates for the adjusted and original sample weight are highly correlated and thus all differences are strongly significant. The adjusted rate produces a slightly higher false-negative rate than the original sample weight and this finding is consistent across sub-groups.

Appendix Table 3. Health Insurance Coverage by Residency Type

In the main paper, the estimates described in Tables 2 and 3 and Figures 1 and 2 are for the civilian non-institutional population. However, the ACS also collects health insurance information from people residing in institutional group quarters. Both the population residing in group quarters and the survey methods used to interview group quarters residents differs from the population in housing units. Therefore, it is plausible that the false-negative rate could also differ. Appendix Table 3 describes the distribution of health insurance in the ACS among linked cases, by residency type. The percent of linked cases that are not coded to Medicaid Plus varies across residency type at a statistically significant level ($p=0.03$), but the variation does not appear to be substantively meaningful. The false negative rate among housing unit residents is 21.6%, among non-institutional residents it is 20.4% and among institutional residents is 20.2%. However, there are starker differences in reports of uninsurance among known Medicaid Plus enrollees, with 9.1% of housing unit residents recorded as uninsured compared to 4.4% and 5.2% among non-institutional residents and institutional residents respectively.

Appendix Table 4a and 4b. Unadjusted and Regression Adjusted False-Negative Rates for Children and Adults, 2009 ACS/MSIS Linked File

Appendix Table 4a describes the data underlying the maps in Figures 1 and 2. The adjusted estimates were obtained from a logistic regression and predicted probabilities were produced using average marginal effects. The regression model included controls for race, gender, poverty, citizenship, household employment and education, and state. The results are discussed in the main manuscript.

Appendix Table 4b. Summary Statistics for Unadjusted and Adjusted State False-Negative Rates

Appendix Table 4b presents summary statistics calculated from the estimates tabulated in Appendix Table 4a. The measures of spread are discussed in the main manuscript. We also show the average false-negative rate across CHIP type (stand-alone, expansion, combination). Readers will note that across CHIP types our data includes similar sets of enrollees: Medicaid enrollees in every state and expansion CHIP enrollees in combination and expansion only states. Table 4b gives an idea of reporting patterns for these common enrollees by CHIP type. We find no variation across states in the false-negative rate for children. After adjusting for demographics, expansion states have a lower average rate compared to stand-alone or combination states, but given the number of expansion states is small it is hard to be confident in this difference. On an unadjusted basis, adults have worse reporting in stand-alone states. The difference between stand-alone and combination states vanishes after adjustment, but expansion only states remain unique.

Appendix Table 5. Logistic Regression Coefficients Predicting False-Negative Reports for Children and Adults, Demographics and State Dummy Model

Appendix Table 5 reports the coefficients from the logistic regression model used to produce the adjusted rates in Appendix Table 4a.

Appendix Table 6. Logistic Regression Coefficients Predicting False-Negative Reports for Children and Adults, Demographics and State Program Models

In Appendix Table 6 we report the coefficients from models of false-negative reports for children and adults on demographics (described above) and state program characteristics. State program characteristics included program name complexity, the income eligibility of children and adults (high, medium, low), if childless adults were covered, CHIP program type (stand-alone, expansion, or combination), and the presumptive eligibility policies (none, pregnant women only, pregnant women and children). Data was obtained from Kaiser (2009). Our interpretation of results is included in the main body of the text.

Appendix Tables 7 and 8. Nested Logistic Regression Results.

Appendix Tables 7 and 8 present the results from nested logistic regressions run on a pooled sample of the 2008 and 2009 ACS that has been merged to enrollment records from the MSIS.[2] Only linked cases are included in the estimation sample, the adjusted weights are used, and the standard errors account for the complexity of the sample design. The first block of variables included age, race, poverty and survey year, the second block included state of residence, and the third block included the interaction of state and categorical year. Appendix Table 7 presents results from predicting a 0/1 variable that indicates not being coded to Medicaid Plus and Appendix Table 8 presents results from predicting uninsured status.

The right most panel of Appendix Table 7 (Model 3), which includes the full set of covariates, shows that young, white, and lower-income individuals were less likely to be undercounted. This is the same conclusion drawn from the unadjusted estimates presented in Table 3 of the main paper. Appendix Table 7 also indicates that the false negative rate is lower in 2009 than in 2008.

Similar to the Appendix Table 4, the regressions in Appendix Table 7 (Model 3) suggested that in the pooled 2008-2009 data, there was wide variation in the false negative rate across the states, even after controlling for demographics. The coefficients for 26 of the state dummy variables were statistically significant (Alabama was arbitrarily chosen as the referent state) and for the vast majority of states the coefficient was positive. More importantly, the F test on the block of state dummy variables was

[2] The 2008 file was merged to the MSIS and weighted using the same methods as the 2009 file. For more 2008 specific results, see http://www.shadac.org/files/shadac/publications/ACSUndercount_WorkingPaper_0.pdf

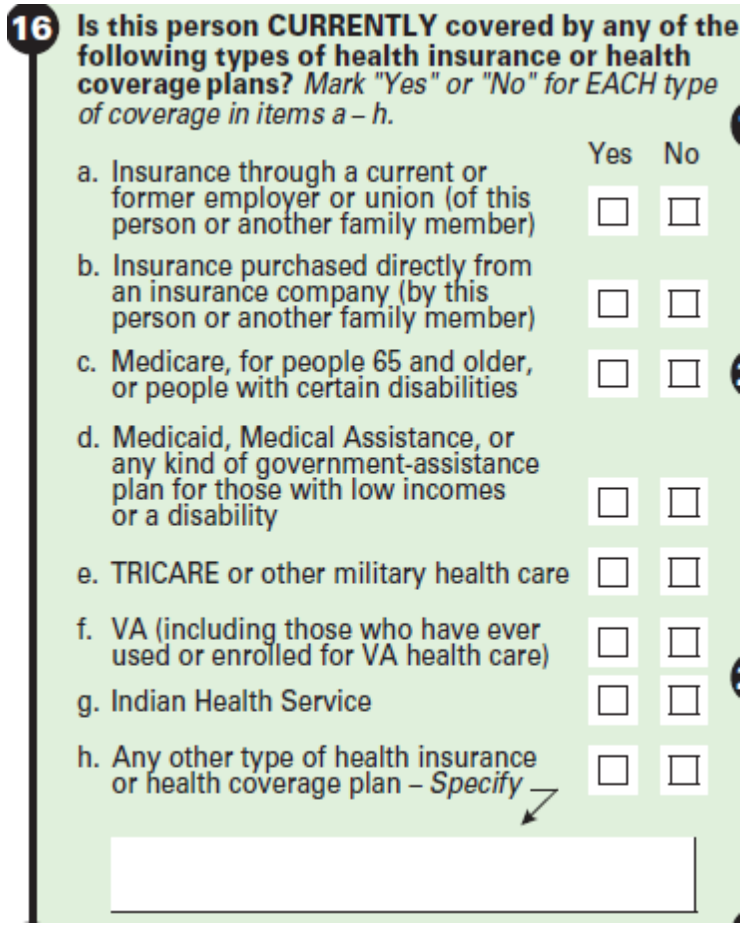
significant ($p< 0.001$), suggesting that the effect of state as a construct was statistically significant, controlling for demographics and year of interview. The third block of variables that included the full set of state-by-time effects was also significant ($p<0.001$) suggesting that the effect of state varies by year (or the effect of year varies by state). In the main paper we discuss the implication of this finding to difference-in-difference evaluations of state driven Medicaid policy changes.

Appendix Table 8 shows that non-elderly adults were more likely to be coded as uninsured compared to children, but the elderly were less likely to be uninsured. This follows the pattern of results shown in Table 3 of the main paper. The regression showed that those in the highest poverty level were more likely than those under 138% of FPL to be uninsured ($p<0.001$). This is a different pattern of results compared to the unadjusted analysis in Table 3. The most interesting result from Appendix Table 8 is that while the year dummy variable was statistically significant as was the block of state dummy variables, the final block of state-by-year interaction effects was not (unlike Appendix Table 7). This suggests that the effect of state on uninsurance for known enrollees does not vary by year.

Appendix Table 9. False-Positive Error Rate, 2009 ACS/MSIS Linked File

For completeness, Appendix Table 9 reports the share of cases that are coded as having Medicaid Plus in the 2009 ACS that we determined were not enrolled on the day of interview, per MSIS. As described in the main text we have no ability to decompose the fraction of these "over-counted" cases that are true false-positives and what fraction are correctly reporting other relevant coverage either not included in the MSIS (e.g., state-sponsored insurance) or are simply absent from the linked data because of missing MSIS PIKs. The first column tabulates Medicaid Plus responses from the ACS for cases that the MSIS shows are not enrolled on the date of interview. For this population, the false-positive rate is 7.1%. The second two columns split the unlinked population into two exhaustive and mutually exclusive groups. The first are cases that are never on the MSIS during our observation window. The false-positive rate for that group is 4.8%. The final column shows the false-positive rate for people that we do find on the MSIS, but who are not enrolled on the specific date of interview. The false-positive rate in that group is much higher: 41.7%. The large false-positive rate in the final group could be caused by error on the MSIS in the timing of enrollment or by confusion among respondents regarding the termination of their benefits.

Appendix Figure 1. 2009 ACS Health Insurance Question (Housing Unit Questionnaire)



16 **Is this person CURRENTLY covered by any of the following types of health insurance or health coverage plans?** *Mark "Yes" or "No" for EACH type of coverage in items a – h.*

	Yes	No
a. Insurance through a current or former employer or union (of this person or another family member)	☐	☐
b. Insurance purchased directly from an insurance company (by this person or another family member)	☐	☐
c. Medicare, for people 65 and older, or people with certain disabilities	☐	☐
d. Medicaid, Medical Assistance, or any kind of government-assistance plan for those with low incomes or a disability	☐	☐
e. TRICARE or other military health care	☐	☐
f. VA (including those who have ever used or enrolled for VA health care)	☐	☐
g. Indian Health Service	☐	☐
h. Any other type of health insurance or health coverage plan – *Specify*	☐	☐

Notes:

The complete housing unit and group quarters questionnaires are available at: http://www.census.gov/acs/www/methodology/questionnaire_archive

The 2009 ACS Instruction guide states: “Mark the ‘Yes’ or ‘No’ box for each part of question 16. If the person reports any other type of coverage plan in 16h, specify the type of coverage or name of the plan in the write-in box. DO NOT include plans that cover only one type of health care (such as dental plans) or plans that only cover a person in case of an accident or disability.”

Appendix Table 1. Distribution of Demographics and Health Insurance Status, by Sample and Weighting Strategy, 2009 ACS

	Full Sample	PIK Sample		Non-PIK Sample	
	Original Weight (A)	Original Weight (B)	Adjusted Weight (C)	Original Weight (D)	A-C
Selected States					
CA	12.0	11.4	12.0	16.8	0.0
NM	0.7	0.6	0.7	1.1	0.0
MS	1.0	1.0	1.0	0.8	0.0
MN	1.7	1.8	1.7	1.1	0.0
MA	2.2	2.2	2.2	1.7	0.0
All Other States	82.5	83.0	82.5	78.6	0.0
Sex					
Female	50.7	50.9	50.7	49.2	-0.1
Male	49.3	49.1	49.3	50.8	0.1
Age group					
0-5	8.2	7.6	7.8	13.0	0.4
6-14	11.9	11.8	12.1	13.2	-0.2
15-18	4.1	4.1	4.2	4.3	-0.1
19-44	37.0	35.9	36.5	45.1	0.5
45-64	25.9	27.0	26.5	17.6	-0.6
65+	12.9	13.7	12.9	6.8	0.0
Race					
White Alone	75.9	77.4	76.1	64.8	-0.2
Black Alone	12.8	12.5	12.9	15.3	0.0
AIAN Alone	1.2	1.1	1.2	1.6	0.0
Asian/NHOPI Alone	5.0	4.8	5.0	6.3	0.0
Other or Mult	5.1	4.2	4.9	12.1	0.2
Hispanic ethnicity					
Non Hispanic	83.8	86.2	84.0	65.6	-0.2
Hispanic	16.2	13.8	16.0	34.4	0.2
Citizenship					
Non-Citizen	13.3	10.9	11.9	31.3	1.5
Citizen	86.7	89.1	88.1	68.7	-1.5
Residence					
Housing Unit	97.3	97.5	97.3	96.3	0.0
Group Quarters	2.7	2.6	2.7	3.8	0.0

Poverty Group					
0-49	6.1	5.3	5.7	11.9	0.4
50-74	3.6	3.3	3.6	6.0	0.1
75-99	4.2	3.9	4.2	6.6	0.0
100-124	4.4	4.1	4.4	6.5	0.0
125-149	4.6	4.3	4.6	6.5	-0.1
150-174	4.4	4.2	4.5	5.7	-0.1
175-199	4.5	4.4	4.7	5.3	-0.2
200+	65.5	67.9	65.6	47.8	-0.1
NIU	2.6	2.5	2.6	3.7	0.0
Insured Status					
Medicaid Only	11.6	11.0	11.6	16.5	0.1
Medicaid In Combo	4.8	5.0	4.9	3.7	-0.1
Other Public Only	3.9	4.1	3.9	2.8	0.0
Private Only	55.8	57.6	55.8	42.4	0.0
Private and Other Public	8.4	9.1	8.5	3.5	-0.1
Uninsured	15.4	13.2	15.4	31.2	0.0

Note: Values are rounded. Differences are based on two significant digits.

Source: 2009 American Community Survey.

Appendix Table 2. False-Negative Rates by Weight for Selected Demographic Groups

	Original Weight	Adjusted Weight
Total	20.8	21.6
Age		
0-18	17.3	17.7
19-64	24.8	26.6
65+	27.1	27.0
Race/ethnicity		
White, non-Hispanic	19.3	19.3
Black, non-Hispanic	21.6	22.0
AIAN, non-Hispanic	23.1	24.4
Asian/NHOPI, non-Hispanic	27.9	28.1
Other/Mult, non-Hispanic	23.0	23.1
Hispanic, any race	21.2	23.4
Citizenship		
Non-Citizen	34.0	38.4
Citizen	20.2	20.7
Poverty level		
0-138	14.7	15.8
139-249	27.1	28.0
250-399	35.7	35.7
400+	39.0	39.1
Weighted Count of Linked Cases	32.3 million	38.6 million

Source: The 2009 linked ACS-MSIS, Civilian Non-Institutional Population.

Appendix Table 3. Health Insurance Coverage in 2009 ACS by Residency Type, Linked Cases

	No Medicaid Plus		Any Medicaid Plus Coverage	Any Other Coverage	Uninsured	P-Value
	% (SE)	P Value	% (SE)	% (SE)	% (SE)	
Residence Type		0.03				0.001
Housing Units	21.6 (0.13)		78.4 (0.13)	12.5 (0.09)	9.1 (0.09)	
Non-Inst GQ	20.4 (0.48)		79.6 (0.48)	16.1 (0.45)	4.4 (0.18)	
Inst GQ	20.2 (0.87)		79.8 (0.87)	15.1 (0.64)	5.2 (0.55)	

Source: Re-weighted estimates from the 2009 linked ACS-MSIS.

Appendix Table 4a. Unadjusted and Regression Adjusted False-Negative Rates for Children and Adults, 2009 ACS/MSIS Linked File

	Children (0-18)				Adults (19 and Over)			
	Unadjusted		Adjusted		Unadjusted		Adjusted	
	%	SE	%	SE	%	SE	%	SE
ALABAMA	12.1	0.8	13.4	0.8	19.8	1.0	22.8	1.1
ALASKA	16.7	2.1	11.9	1.6	18.3	2.4	17.5	2.4
ARIZONA	20.2	1.3	20.1	1.3	34.2	1.1	31.8	1.1
ARKANSAS	12.5	0.9	13.4	0.9	24.9	1.7	28.1	1.7
CALIFORNIA	18.8	0.4	18.4	0.4	28.8	0.4	25.0	0.4
COLORADO	18.1	1.4	18.2	1.5	31.7	1.8	31.3	1.7
CONNECTICUT	18.6	1.3	15.7	1.2	26.3	1.4	24.9	1.3
DELAWARE	15.3	2.2	14.0	1.8	22.1	2.1	21.6	1.9
DISTRICT OF COLUMBIA	17.4	2.7	15.2	2.2	20.3	2.4	18.8	2.0
FLORIDA	21.8	0.7	21.9	0.7	30.9	0.7	29.3	0.7
GEORGIA	20.6	0.8	21.4	0.8	33.4	1.0	34.2	1.0
HAWAII	19.7	1.9	13.4	1.5	28.7	2.0	27.0	1.8
IDAHO	15.5	1.7	17.1	1.8	23.5	2.7	27.0	2.7
ILLINOIS	18.4	0.6	17.5	0.6	33.3	0.8	33.0	0.7
INDIANA	18.4	0.9	19.9	0.9	28.4	1.2	32.2	1.2
IOWA	16.4	1.1	17.3	1.1	22.6	1.3	25.9	1.4
KANSAS	17.1	1.3	18.9	1.2	22.3	1.5	25.8	1.6
KENTUCKY	13.6	1.0	15.9	1.1	20.9	1.1	27.2	1.2
LOUISIANA	18.8	0.9	17.5	0.9	32.1	1.2	34.0	1.2
MAINE	10.5	1.2	10.7	1.2	16.1	1.0	19.3	1.2
MARYLAND	21.4	1.1	17.3	0.9	31.9	1.2	30.4	1.1
MASSACHUSETTS	13.3	0.9	11.9	0.8	18.5	0.7	18.7	0.7
MICHIGAN	14.7	0.6	15.8	0.6	20.3	0.7	23.1	0.7
MINNESOTA	17.9	1.0	17.6	1.0	22.2	0.7	24.2	0.8
MISSISSIPPI	15.3	1.0	16.3	1.1	23.2	1.2	25.7	1.2
MISSOURI	14.8	0.8	16.0	0.9	23.5	1.0	27.7	1.1
MONTANA	18.0	2.6	19.5	2.5	28.2	3.2	32.0	3.4
NEBRASKA	12.1	1.3	12.4	1.3	19.2	2.4	23.0	2.7
NEVADA	25.5	2.5	25.1	2.4	33.5	2.5	31.8	2.3

NEW HAMPSHIRE	15.5	2.1	14.6	1.9	22.0	2.4	25.5	2.6
NEW JERSEY	23.5	1.2	21.6	1.1	29.3	1.1	26.7	1.1
NEW MEXICO	19.4	1.2	17.6	1.1	30.8	1.9	28.5	1.8
NEW YORK	15.0	0.5	14.3	0.5	23.3	0.4	21.0	0.4
NORTH CAROLINA	14.9	0.7	15.4	0.8	23.3	0.8	25.8	0.9
NORTH DAKOTA	18.6	3.4	18.0	3.1	22.0	3.8	25.6	4.1
OHIO	15.9	0.5	17.6	0.5	20.3	0.6	24.2	0.6
OKLAHOMA	17.0	1.1	17.1	1.1	33.5	1.2	36.9	1.3
OREGON	15.5	1.2	16.7	1.3	25.8	1.6	28.7	1.7
PENNSYLVANIA	17.7	0.7	17.4	0.6	24.8	0.6	27.2	0.6
RHODE ISLAND	24.7	2.5	23.0	2.4	26.2	2.4	26.5	2.2
SOUTH CAROLINA	15.9	1.0	16.5	1.0	21.1	1.0	23.7	1.1
SOUTH DAKOTA	17.9	2.3	17.5	2.2	22.5	3.2	25.6	3.6
TENNESSEE	18.5	0.8	19.9	0.8	28.0	0.8	31.6	0.8
TEXAS	18.5	0.5	19.5	0.5	33.2	0.7	31.0	0.7
UTAH	16.4	1.8	16.3	1.8	24.5	2.2	25.9	2.2
VERMONT	11.4	1.8	10.1	1.6	15.1	1.6	17.2	1.8
VIRGINIA	23.4	1.0	22.6	0.9	23.3	1.1	25.1	1.2
WASHINGTON	18.7	1.1	17.4	1.0	22.7	1.2	24.0	1.2
WEST VIRGINIA	14.1	1.1	16.0	1.2	18.2	1.3	24.1	1.5
WISCONSIN	14.8	0.8	15.2	0.8	28.3	0.8	30.8	0.8
WYOMING	23.0	3.4	21.6	3.0	27.5	4.2	29.2	4.5

Source: Re-weighted estimates from the 2009 linked ACS-MSIS. Regression adjusted estimates are from logistic regression models that control for race, gender, poverty, citizenship, household education, household employment, and state. Predicted probabilities were obtained from average marginal effects.

Appendix Table 4b. Summary Statistics for Unadjusted and Adjusted State False-Negative Rates

	Children (0-18)		Adults (19 and Over)	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Mean	17.3	17.0	25.2	26.6
SD	3.3	3.2	5.0	4.4
Min	10.5	10.1	15.1	17.2
Max	25.5	25.1	34.2	36.9
Range (Max-Min)	15.0	15.0	19.1	19.7
Mean in CHIP Stand-Alone Only States	17.6	17.7	26.0	27.1
Mean in CHIP Expansion Only States	17.5	15.1	24.2	24.2
Mean in CHIP Combination States	17.1	17.2	24.9	26.9

Source: The summary statistics displayed in this table were produced from the data presented in Appendix Table 4a.

Appendix Table 5. Logistic Regression Coefficients Predicting False-Negative Reports for Children and Adults, Demographics and State Dummy Models

	Children (Age 0-18)			Adults (Age 19+)		
	Est.	SE	P-Value	Est.	SE	P-Value
Demographic Controls						
White, non-Hispanic	REF			REF		
Black, non-Hispanic	0.20	0.03	0.000	0.33	0.02	0.000
AIAN, non-Hispanic	0.43	0.08	0.000	0.43	0.07	0.000
Asian/NHOPI, non-Hispanic	0.42	0.05	0.000	0.25	0.03	0.000
Other/Mult, non-Hispanic	-0.05	0.15	0.761	0.59	0.14	0.000
Hispanic, any race	0.18	0.02	0.000	0.48	0.02	0.000
Female	REF			REF		
Male	0.00	0.01	0.752	0.11	0.01	0.000
0-138 FPL	REF			REF		
139-249 FPL	0.88	0.02	0.000	0.54	0.02	0.000
250-399 FPL	1.34	0.03	0.000	0.72	0.02	0.000
400+ FPL	1.66	0.04	0.000	0.71	0.03	0.000
NIU FPL	0.63	0.06	0.000	1.79	0.11	0.000
Non-Citizen	REF			REF		
Citizen	-0.74	0.07	0.000	-0.54	0.02	0.000
LT High School	REF			REF		
HS or GED	0.07	0.03	0.011	0.04	0.02	0.034
More than HS	0.14	0.03	0.000	0.05	0.02	0.008
Employed	REF			REF		
Unemployed	-0.27	0.08	0.001	-0.12	0.04	0.001
Not in labor force	-0.51	0.03	0.000	-0.33	0.02	0.000
State Dummies						
ALABAMA	-0.34	0.20	0.091	-0.16	0.22	0.474
ALASKA	-0.47	0.23	0.046	-0.51	0.25	0.049
ARIZONA	0.18	0.19	0.333	0.32	0.20	0.113
ARKANSAS	-0.34	0.17	0.056	0.14	0.21	0.524
CALIFORNIA	0.07	0.16	0.676	-0.03	0.20	0.874
COLORADO	0.06	0.18	0.764	0.30	0.22	0.177
CONNECTICUT	-0.14	0.20	0.495	-0.04	0.21	0.859
DELAWARE	-0.28	0.21	0.195	-0.23	0.24	0.336
DISTRICT OF COLUMBIA	-0.18	0.25	0.468	-0.41	0.27	0.125
FLORIDA	0.30	0.17	0.087	0.20	0.20	0.329
GEORGIA	0.27	0.17	0.126	0.44	0.21	0.040
HAWAII	-0.33	0.22	0.135	0.08	0.23	0.739
IDAHO	-0.03	0.20	0.883	0.08	0.23	0.740
ILLINOIS	0.00	0.17	0.999	0.38	0.21	0.072
INDIANA	0.17	0.18	0.329	0.34	0.22	0.119
IOWA	-0.01	0.19	0.940	0.02	0.23	0.945
KANSAS	0.10	0.20	0.607	0.01	0.23	0.962
KENTUCKY	-0.12	0.17	0.482	0.09	0.20	0.659

LOUISIANA	0.00	0.18	0.993	0.43	0.21	0.048
MAINE	-0.60	0.20	0.003	-0.38	0.21	0.067
MARYLAND	-0.01	0.18	0.941	0.25	0.20	0.209
MASSACHUSETTS	-0.48	0.19	0.014	-0.42	0.21	0.051
MICHIGAN	-0.13	0.17	0.455	-0.14	0.21	0.501
MINNESOTA	0.01	0.17	0.946	-0.08	0.20	0.709
MISSISSIPPI	-0.09	0.19	0.636	0.01	0.20	0.967
MISSOURI	-0.11	0.18	0.521	0.11	0.22	0.603
MONTANA	0.14	0.26	0.588	0.33	0.26	0.199
NEBRASKA	-0.43	0.20	0.041	-0.15	0.25	0.555
NEVADA	0.49	0.24	0.040	0.32	0.23	0.167
NEW HAMPSHIRE	-0.22	0.23	0.340	0.00	0.27	0.996
NEW JERSEY	0.28	0.17	0.091	0.06	0.21	0.765
NEW MEXICO	0.01	0.18	0.956	0.16	0.21	0.450
NEW YORK	-0.25	0.17	0.129	-0.27	0.20	0.190
NORTH CAROLINA	-0.16	0.19	0.402	0.02	0.21	0.941
NORTH DAKOTA	0.03	0.28	0.901	0.00	0.30	0.995
OHIO	0.01	0.17	0.963	-0.08	0.20	0.697
OKLAHOMA	-0.03	0.17	0.867	0.56	0.20	0.007
OREGON	-0.06	0.19	0.761	0.17	0.23	0.469
PENNSYLVANIA	-0.01	0.17	0.963	0.09	0.21	0.662
RHODE ISLAND	0.37	0.22	0.105	0.05	0.23	0.832
SOUTH CAROLINA	-0.08	0.17	0.659	-0.11	0.20	0.607
SOUTH DAKOTA	REF			REF		
TENNESSEE	0.17	0.17	0.323	0.31	0.21	0.142
TEXAS	0.15	0.17	0.390	0.28	0.21	0.190
UTAH	-0.09	0.22	0.671	0.02	0.22	0.928
VERMONT	-0.67	0.25	0.010	-0.52	0.24	0.031
VIRGINIA	0.34	0.18	0.057	-0.03	0.21	0.904
WASHINGTON	-0.01	0.17	0.968	-0.09	0.22	0.695
WEST VIRGINIA	-0.11	0.18	0.533	-0.08	0.20	0.679
WISCONSIN	-0.18	0.18	0.325	0.28	0.21	0.200
WYOMING	0.28	0.24	0.246	0.19	0.29	0.516
Intercept	-1.03	0.18	0.000	-0.92	0.21	0.000

Source: Re-weighted estimates from the 2009 linked ACS-MSIS. South Dakota was chosen as the referent category because it had the median unadjusted false-negative rate.

Appendix Table 6. Logistic Regression Coefficients Predicting False-Negative Reports for Children and Adults, Demographics and State Program Characteristics Models

	Children (Age 0-18)			Adults (Age 19+)		
	Est.	SE	P-Value	Est.	SE	P-Value
Demographic Controls						
White, non-Hispanic	REF			REF		
Black, non-Hispanic	0.22	0.02	0.000	0.34	0.02	0.000
AIAN, non-Hispanic	0.40	0.07	0.000	0.46	0.06	0.000
Asian/NHOPI, non-Hispanic	0.42	0.05	0.000	0.25	0.03	0.000
Other/Mult, non-Hispanic	-0.01	0.15	0.959	0.56	0.14	0.000
Hispanic, any race	0.23	0.02	0.000	0.51	0.02	0.000
Female	REF			REF		
Male	0.00	0.01	0.760	0.10	0.01	0.000
0-138 FPL	REF			REF		
139-249 FPL	0.88	0.02	0.000	0.55	0.02	0.000
250-399 FPL	1.35	0.03	0.000	0.73	0.02	0.000
400+ FPL	1.66	0.04	0.000	0.71	0.03	0.000
NIU FPL	0.62	0.06	0.000	1.74	0.11	0.000
Non-Citizen	REF			REF		
Citizen	-0.75	0.06	0.000	-0.53	0.02	0.000
LT High School	REF			REF		
HS or GED	0.07	0.03	0.007	0.05	0.02	0.014
More than HS	0.15	0.03	0.000	0.06	0.02	0.002
Employed	REF			REF		
Unemployed	-0.26	0.08	0.002	-0.12	0.04	0.002
Not in labor force	-0.50	0.03	0.000	-0.33	0.02	0.000
Program Name						
Simple	REF			REF		
Complex	-0.06	0.02	0.018	0.15	0.02	0.000
Child Income Eligibility						
High	REF			REF		
Low	0.07	0.03	0.010	0.18	0.03	0.000
Medium	0.13	0.03	0.000	0.19	0.03	0.000
Parent Income Eligibility						
High	REF			REF		
Low	-0.09	0.04	0.011	0.01	0.03	0.657
Medium	0.04	0.03	0.243	-0.04	0.02	0.067
Coverage for Childless Adults						
No	REF			REF		
Yes	-0.12	0.03	0.000	-0.24	0.03	0.000
CHIP Type						
Combination	REF			REF		
Expansion	-0.13	0.04	0.002	-0.14	0.04	0.000

Stand Alone	0.01	0.02	0.523	0.06	0.02	0.011
Presumptive Eligibility Policy						
None	REF			REF		
Pregnant Women Only	-0.04	0.03	0.162	0.01	0.03	0.561
Pregnant Women and Children	-0.15	0.03	0.000	-0.06	0.03	0.018
Intercept	-0.94	0.08	0.000	-1.03	0.05	0.000

Source: Re-weighted estimates from the 2009 linked ACS-MSIS. State program characteristics data comes from Kaiser, 2009.

Appendix Table 7. Nested Logistic Regression of No Medicaid Plus Among Linked Cases

	Model 1			Model 2			Model 3		
	Coef	SE	P-Value	Coef	SE	P-Value	Coef	SE	P-Value
Block 1									
Intercept	-1.96	0.01	0.000	-2.20	0.04	0.000	-2.12	0.06	0.000
Age 0-18	Ref			Ref			Ref		
Age 19-64	0.49	0.01	0.000	0.51	0.01	0.000	0.51	0.01	0.000
Age 65+	0.34	0.01	0.000	0.36	0.01	0.000	0.36	0.01	0.000
White, non-Hispanic	Ref			Ref			Ref		
Black, non-Hispanic	0.29	0.01	0.000	0.27	0.01	0.000	0.27	0.01	0.000
AIAN, non-Hispanic	0.42	0.04	0.000	0.40	0.04	0.000	0.40	0.04	0.000
Asian/NHOPI, non-Hispanic	0.32	0.02	0.000	0.36	0.02	0.000	0.36	0.02	0.000
Other/Mult, non-Hispanic	0.40	0.08	0.000	0.43	0.08	0.000	0.43	0.08	0.000
Hispanic, any race	0.37	0.01	0.000	0.35	0.01	0.000	0.35	0.01	0.000
FPL 0-138	Ref			Ref			Ref		
FPL 139-249	0.76	0.01	0.000	0.76	0.01	0.000	0.76	0.01	0.000
FPL 250-400	1.10	0.01	0.000	1.10	0.01	0.000	1.10	0.01	0.000
FPL 400+	1.20	0.02	0.000	1.20	0.02	0.000	1.20	0.02	0.000
Not in Poverty Universe	0.46	0.04	0.000	0.46	0.04	0.000	0.46	0.04	0.000
Year 2008	Ref			Ref			Ref		
Year 2009	-0.13	0.01	0.000	-0.13	0.01	0.000	-0.31	0.07	0.000
F Test for Block 1	13272		0.000						
Block 2									
AL				Ref			Ref		
AK				-0.17	0.09	0.060	-0.18	0.13	0.146
AZ				0.47	0.05	0.000	0.39	0.07	0.000
AR				-0.01	0.06	0.918	-0.12	0.09	0.155
CA				0.20	0.04	0.000	0.09	0.06	0.123
CO				0.42	0.06	0.000	0.42	0.08	0.000
CT				0.15	0.06	0.014	0.08	0.09	0.347
DE				-0.03	0.10	0.777	-0.08	0.15	0.600
DC				-0.20	0.11	0.080	-0.37	0.14	0.013
FL				0.47	0.04	0.000	0.39	0.06	0.000
GA				0.47	0.05	0.000	0.33	0.06	0.000
HI				0.18	0.07	0.018	0.19	0.12	0.116
ID				0.34	0.08	0.000	0.37	0.11	0.001
IL				0.39	0.05	0.000	0.32	0.06	0.000
IN				0.43	0.05	0.000	0.34	0.07	0.000
IA				0.19	0.05	0.000	0.09	0.07	0.238
KS				0.22	0.06	0.000	0.10	0.09	0.257
KY				0.03	0.06	0.580	-0.18	0.08	0.038
LA				0.30	0.04	0.000	0.15	0.06	0.015
ME				-0.26	0.07	0.001	-0.35	0.10	0.001

MD		0.30	0.05	0.000	0.19	0.08	0.016
MA		-0.13	0.05	0.018	-0.12	0.07	0.105
MI		0.06	0.04	0.191	-0.03	0.06	0.594
MN		0.22	0.06	0.000	0.17	0.07	0.013
MS		0.15	0.06	0.009	0.08	0.09	0.388
MO		0.15	0.05	0.002	0.04	0.07	0.624
MT		0.28	0.10	0.006	0.08	0.14	0.596
NE		-0.11	0.08	0.201	-0.19	0.10	0.057
NV		0.65	0.09	0.000	0.62	0.13	0.000
NH		0.18	0.09	0.057	0.17	0.14	0.203
NJ		0.38	0.06	0.000	0.29	0.08	0.000
NM		0.23	0.08	0.004	0.11	0.11	0.318
NY		0.00	0.04	0.946	-0.06	0.06	0.319
NC		0.11	0.05	0.021	0.02	0.06	0.767
ND		0.35	0.12	0.004	0.33	0.17	0.050
OH		0.24	0.05	0.000	0.24	0.06	0.000
OK		0.40	0.05	0.000	0.28	0.07	0.000
OR		0.21	0.08	0.011	0.08	0.12	0.515
PA		0.24	0.04	0.000	0.16	0.06	0.011
RI		0.29	0.08	0.001	0.05	0.12	0.687
SC		0.26	0.06	0.000	0.33	0.07	0.000
SD		0.05	0.12	0.678	-0.26	0.16	0.104
TN		0.42	0.05	0.000	0.34	0.07	0.000
TX		0.36	0.04	0.000	0.27	0.06	0.000
UT		0.29	0.08	0.000	0.35	0.11	0.002
VT		-0.50	0.09	0.000	-0.72	0.12	0.000
VA		0.39	0.06	0.000	0.32	0.08	0.000
WA		0.29	0.06	0.000	0.28	0.08	0.001
WV		0.06	0.06	0.354	-0.05	0.09	0.570
WI		0.19	0.05	0.000	-0.06	0.08	0.425
WY		0.35	0.11	0.002	0.15	0.17	0.382
F Test for Block 2		22		0.000			
Block 3							
AL*2009					Ref		
AK*2009					0.02	0.18	0.900
AZ*2009					0.16	0.10	0.104
AR*2009					0.24	0.12	0.047
CA*2009					0.23	0.07	0.003
CO*2009					0.02	0.13	0.888
CT*2009					0.14	0.14	0.307
DE*2009					0.10	0.19	0.596
DC*2009					0.34	0.19	0.082
FL*2009					0.18	0.08	0.031
GA*2009					0.28	0.09	0.003
HI*2009					-0.01	0.16	0.959
ID*2009					-0.07	0.15	0.655
IL*2009					0.15	0.08	0.049

IN*2009			0.17	0.08	0.038
IA*2009			0.21	0.09	0.027
KS*2009			0.23	0.12	0.053
KY*2009			0.42	0.11	0.000
LA*2009			0.30	0.08	0.001
ME*2009			0.17	0.13	0.193
MD*2009			0.22	0.11	0.056
MA*2009			-0.03	0.10	0.794
MI*2009			0.18	0.08	0.025
MN*2009			0.11	0.09	0.240
MS*2009			0.14	0.13	0.282
MO*2009			0.23	0.11	0.030
MT*2009			0.41	0.18	0.024
NE*2009			0.17	0.15	0.268
NV*2009			0.07	0.17	0.703
NH*2009			0.01	0.18	0.952
NJ*2009			0.20	0.10	0.043
NM*2009			0.23	0.13	0.079
NY*2009			0.13	0.08	0.118
NC*2009			0.19	0.08	0.025
ND*2009			0.04	0.25	0.868
OH*2009			0.00	0.08	0.997
OK*2009			0.23	0.10	0.020
OR*2009			0.26	0.13	0.048
PA*2009			0.18	0.08	0.031
RI*2009			0.46	0.19	0.020
SC*2009			-0.16	0.10	0.134
SD*2009			0.59	0.23	0.013
TN*2009			0.17	0.09	0.063
TX*2009			0.17	0.07	0.026
UT*2009			-0.11	0.16	0.508
VT*2009			0.44	0.18	0.015
VA*2009			0.15	0.09	0.108
WA*2009			0.01	0.11	0.962
WV*2009			0.22	0.12	0.072
WI*2009			0.44	0.10	0.000
WY*2009			0.40	0.23	0.090
F Test for Block 3			4.00		0.000

Source: Re-weighted estimates from the 2008 and 2009 linked ACS-MSIS.

Appendix Table 8. Nested Logistic Regression of Uninsurance Among Linked Cases

	Model 1			Model 2			Model 3		
	Coef.	SE	P-Value	Coef.	SE	P-Value	Coef.	SE	P-Value
Block 1									
Intercept	-2.92	0.02	0.000	-3.24	0.07	0.000	-3.15	0.11	0.000
Age 0-18	Ref			Ref			Ref		
Age 19-64	0.80	0.01	0.000	0.88	0.01	0.000	0.88	0.01	0.000
Age 65+	-1.76	0.06	0.000	-1.75	0.06	0.000	-1.75	0.06	0.000
White, non-Hispanic	Ref			Ref			Ref		
Black, non-Hispanic	0.21	0.02	0.000	0.16	0.02	0.000	0.16	0.02	0.000
AIAN, non-Hispanic	0.92	0.05	0.000	0.85	0.05	0.000	0.85	0.05	0.000
Asian/NHOPI, non-Hispanic	0.37	0.03	0.000	0.49	0.04	0.000	0.49	0.04	0.000
Other/Mult, non-Hispanic	0.29	0.15	0.047	0.40	0.15	0.009	0.40	0.15	0.007
Hispanic, any race	0.83	0.02	0.000	0.77	0.02	0.000	0.77	0.02	0.000
FPL 0-138	Ref			Ref			Ref		
FPL 139-249	0.27	0.02	0.000	0.28	0.02	0.000	0.28	0.02	0.000
FPL 250-400	0.22	0.02	0.000	0.23	0.02	0.000	0.23	0.02	0.000
FPL 400+	0.09	0.03	0.004	0.12	0.03	0.000	0.12	0.03	0.000
Not in Poverty Universe	0.03	0.07	0.627	0.05	0.07	0.469	0.05	0.07	0.468
Year 2008	Ref			Ref			Ref		
Year 2009	-0.12	0.01	0.000	-0.12	0.01	0.000	-0.29	0.12	0.019
F Test for Block 1	442		0.000						
Block 2									
AL				Ref			Ref		
AK				0.21	0.14	0.138	0.08	0.19	0.675
AZ				0.59	0.08	0.000	0.59	0.11	0.000
AR				0.22	0.10	0.028	0.14	0.14	0.299
CA				0.24	0.08	0.002	0.12	0.10	0.234
CO				0.73	0.10	0.000	0.73	0.14	0.000
CT				-0.23	0.11	0.035	-0.39	0.15	0.011
DE				-0.02	0.17	0.898	0.02	0.24	0.917
DC				-0.83	0.18	0.000	-0.99	0.30	0.001
FL				0.81	0.08	0.000	0.74	0.11	0.000
GA				0.78	0.08	0.000	0.60	0.11	0.000
HI				-0.55	0.14	0.000	-0.71	0.23	0.003
ID				0.62	0.12	0.000	0.61	0.15	0.000
IL				0.26	0.08	0.002	0.16	0.12	0.169
IN				0.63	0.08	0.000	0.58	0.12	0.000
IA				0.17	0.10	0.083	0.05	0.15	0.720
KS				0.35	0.11	0.002	0.31	0.18	0.086
KY				0.15	0.10	0.140	-0.05	0.14	0.738

LA		0.53	0.08	0.000	0.35	0.11	0.001
ME		-0.30	0.11	0.007	-0.27	0.15	0.082
MD		0.26	0.09	0.007	0.18	0.12	0.142
MA		-1.18	0.09	0.000	-1.26	0.14	0.000
MI		0.05	0.08	0.527	-0.05	0.11	0.677
MN		0.10	0.09	0.279	-0.01	0.14	0.948
MS		0.55	0.10	0.000	0.52	0.13	0.000
MO		0.30	0.08	0.000	0.24	0.12	0.045
MT		0.27	0.18	0.125	0.15	0.24	0.542
NE		0.06	0.14	0.685	-0.16	0.18	0.398
NV		0.90	0.11	0.000	0.97	0.18	0.000
NH		0.02	0.13	0.878	0.13	0.19	0.491
NJ		0.33	0.09	0.001	0.24	0.12	0.058
NM		0.35	0.11	0.001	0.28	0.15	0.067
NY		-0.19	0.08	0.018	-0.29	0.12	0.015
NC		0.36	0.08	0.000	0.25	0.11	0.029
ND		0.25	0.16	0.134	0.14	0.27	0.607
OH		0.21	0.09	0.018	0.23	0.12	0.056
OK		0.48	0.10	0.000	0.39	0.12	0.002
OR		0.33	0.12	0.006	0.17	0.19	0.376
PA		-0.16	0.08	0.044	-0.23	0.11	0.047
RI		-0.36	0.15	0.016	-0.62	0.25	0.015
SC		0.42	0.10	0.000	0.50	0.13	0.000
SD		0.18	0.16	0.264	-0.18	0.20	0.354
TN		0.24	0.09	0.008	0.12	0.13	0.368
TX		0.71	0.07	0.000	0.61	0.11	0.000
UT		0.66	0.12	0.000	0.75	0.16	0.000
VT		-0.90	0.19	0.000	-1.36	0.31	0.000
VA		0.46	0.09	0.000	0.41	0.13	0.003
WA		0.39	0.10	0.000	0.33	0.14	0.023
WV		0.18	0.12	0.130	0.21	0.16	0.206
WI		-0.09	0.08	0.306	-0.22	0.12	0.071
WY		0.43	0.19	0.029	0.25	0.26	0.345
F Test for Block 2		42		0.000			
Block 3							
AL*2009					Ref		
AK*2009					0.26	0.25	0.297
AZ*2009					-0.03	0.15	0.815
AR*2009					0.17	0.16	0.305
CA*2009					0.24	0.12	0.046
CO*2009					0.01	0.19	0.963
CT*2009					0.32	0.20	0.128
DE*2009					-0.10	0.30	0.745
DC*2009					0.33	0.44	0.449
FL*2009					0.15	0.13	0.261
GA*2009					0.35	0.15	0.019
HI*2009					0.33	0.28	0.241
ID*2009					0.02	0.20	0.918

IL*2009			0.20	0.14	0.169
IN*2009			0.11	0.15	0.462
IA*2009			0.23	0.19	0.222
KS*2009			0.08	0.23	0.715
KY*2009			0.40	0.16	0.019
LA*2009			0.35	0.13	0.009
ME*2009			-0.10	0.25	0.696
MD*2009			0.16	0.15	0.292
MA*2009			0.18	0.19	0.339
MI*2009			0.20	0.13	0.139
MN*2009			0.22	0.19	0.241
MS*2009			0.06	0.15	0.685
MO*2009			0.13	0.15	0.379
MT*2009			0.26	0.29	0.376
NE*2009			0.41	0.26	0.116
NV*2009			-0.13	0.26	0.609
NH*2009			-0.24	0.31	0.445
NJ*2009			0.18	0.16	0.269
NM*2009			0.15	0.17	0.407
NY*2009			0.20	0.14	0.151
NC*2009			0.21	0.14	0.14
ND*2009			0.22	0.37	0.556
OH*2009			-0.04	0.13	0.75
OK*2009			0.19	0.13	0.165
OR*2009			0.32	0.23	0.163
PA*2009			0.14	0.16	0.365
RI*2009			0.50	0.32	0.129
SC*2009			-0.18	0.18	0.315
SD*2009			0.68	0.28	0.018
TN*2009			0.24	0.16	0.142
TX*2009			0.20	0.13	0.121
UT*2009			-0.18	0.22	0.429
VT*2009			0.84	0.36	0.021
VA*2009			0.12	0.17	0.479
WA*2009			0.13	0.18	0.467
WV*2009			-0.06	0.20	0.757
WI*2009			0.26	0.15	0.077
WY*2009			0.36	0.34	0.299
F Test for Block 3			1		0.34

Source: Re-weighted estimates from the 2008 and 2009 linked ACS-MSIS.

Appendix Table 9. False-Positive Error Rate, 2009 ACS/MSIS Linked File						
	Not enrolled on date of interview, per MSIS		Never on MSIS		In MSIS (Q4 2008-Q1 2010), but not enrolled on day of interview	
Weighted Count	262,576,519		246,425,886		16,150,633	
	%	SE	%	SE	%	SE
No Medicaid Plus	92.9	0.02	95.2	0.02	58.3	0.21
Medicaid Plus (False-Positive Rate)	7.1	0.02	4.8	0.02	41.7	0.21

Source: Re-weighted estimates from the 2009 ACS, civilian non-institutional population. The false-positive rate is defined as the weighted fraction of cases not found on the MSIS that report Medicaid Plus.